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OFFICES STATE BOARD OF HORTICULTURE.

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No. 1. ASSEMBLY AND RECEPTION ROOM.

No. 2. REAR VIEW OF SAME.

No. 3. SECRETARY'S ROOM.

No. 4. MAILING ROOM.

THIRD BIENNIAL REPORT

OF THE

STATE BOARD OF HORTICULTURE

OF THE

STATE OF CALIFORNIA,

FOR THE

THIRTY-EIGHTH AND THIRTY-NINTH FISCAL YEARS.

EDITED BY THE SECRETARY.

SACRAMENTO:
STATE OFFICE, : : : : J. D. YOUNG, SUPT. STATE PRINTING.
1888.

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1886/88

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OFFICERS AND MEMBERS OF THE BOARD.

Hon. ELLWOOD COOPER, President .... Santa Barbara,
Commissioner for the Los Angeles District.

Rev. N. R. PECK, Vice-President .... Penryn,
Commissioner for the El Dorado District.

Gen. M. G. VALLEJO, Treasurer .... Sonoma,
Commissioner for the Sonoma District.

Dr. EDWIN KIMBALL, Auditor .... Haywards,
Commissioner for the State at large.

FRANK A. KIMBALL* .... National City,
Commissioner for the State at large.

SOL. RUNYON .... Courtland,
Commissioner for the Sacramento District.

W. M. BOGGS .... Napa City,
Commissioner for the Napa District.

W. C. WEST .... Fresno,
Commissioner for the San Joaquin District.

A. BLOCK .... Santa Clara,
Commissioner for the San Francisco District.

B. M. LELONG, Secretary.

Office of the Board:
No. 220 Sutter Street, San Francisco.

W. G. KLEE .... Inspector of Fruit Pests.

---

* Commissioned August 23, 1888, to succeed Mr. A. Scott Chapman, resigned August 11, 1888.

To his Excellency R. W. WATERMAN, *Governor, and to the honorable the Senate and Assembly of the State of California:*

In accordance with the Act of the Legislature, approved March 13, 1883, we, the State Board of Horticulture of the State of California, respectfully submit to your kind consideration this our biennial report for the thirty-eighth and thirty-ninth fiscal years, ending June 30, 1888.

ELLWOOD COOPER, President.

Attest: B. M. LELONG, Secretary.

SAN FRANCISCO, July 2, 1888.

STATE BOARD OF HORTICULTURE.

AN ACT

To create and establish a State Board of Horticulture, and appropriate money for the expenses thereof.

[Approved March 13, 1883.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. There shall be a State Board of Horticulture, consisting of nine members, who shall be appointed by the Governor; two from the State at large, and one from each of the seven horticultural districts, which are hereby constituted as follows:

First—The Sonoma District, which shall include the Counties of Sonoma, Marin, Lake, Mendocino, Humboldt, Del Norte, Trinity, and Siskiyou.

Second—The Napa District, which shall include the Counties of Napa, Solano, and Contra Costa.

Third—The San Francisco District, which shall include the City and County of San Francisco, and the Counties of San Mateo, Alameda, Santa Clara, Santa Cruz, San Benito, and Monterey.

Fourth—The Los Angeles District, which shall include the Counties of Los Angeles, Ventura, Santa Barbara, San Luis Obispo, San Bernardino, and San Diego.

Fifth—The Sacramento District, which shall include the Counties of Sacramento, Yolo, Sutter, Colusa, Butte, Tehama, and Shasta.

Sixth—The San Joaquin District, which shall include the Counties of San Joaquin, Stanislaus, Merced, Fresno, Tulare, and Kern.

Seventh—The El Dorado District, which shall include the Counties of El Dorado, Amador, Calaveras, Tuolumne, Mariposa, Placer, Nevada, Yuba, Sierra, Plumas, Lassen, Modoc, Alpine, Mono, and Inyo.

SEC. 2. The members appointed from each district shall be residents of the district from which they are appointed, and shall be specially qualified by practical experience and study in connection with the industries dependent upon horticulture. They shall each hold office for the term of four years, except that of the nine first appointed, four, to be determined by lot, shall retire at the end of two years, when their successors shall be appointed by the Governor.

SEC. 3. The Board shall appoint and prescribe the duties of a Secretary, who shall not be one of their number, and elect of their own number a Treasurer, both to hold office during the pleasure of the said Board. The Treasurer shall give a bond to the State, with sureties approved by the said Board, in the sum of ten thousand dollars, for the faithful discharge of his duties.

SEC. 4. The Board may receive, manage, use, and hold donations and bequests for promoting the objects of its formation. It shall meet semi-annually, and as much oftener, and at such places, as it may deem expedient, to consult and adopt such measures as may best promote the horticultural industries of the State. It may, but without expense to the State, select and appoint competent and qualified persons to lecture in each of the horticultural districts named in section one of this Act, for the purpose of illustrating practical horticultural topics, and imparting instruction in the methods of culture, pruning, fertilizing, and also in the best methods of treating the diseases of fruit and fruit trees, cleansing orchards, and exterminating insect pests. The office of the Board shall be kept open to the public, subject to the rules of the Board, every day, excepting legal holidays, and shall be in charge of the Secretary during the absence of the Board.

SEC. 5. For the purpose of preventing the spread of contagious disease among fruit and fruit trees, and for the prevention, treatment, cure, and extirpation of fruit pests and the diseases of fruit and fruit trees, and for the disinfection of grafts, scions, orchard debris, empty fruit boxes and packages, and other suspected material or transportable articles, dangerous to orchards, fruit, and fruit trees, said Board shall make regulations for the inspection and disinfection thereof, which said regulations shall be circulated in printed form by the Board among the fruit growers and fruit dealers of the State, shall be published at least twenty days in two daily newspapers of general circulation in the State not of the same city or county, and shall be posted in three conspicuous places in each county in the State, one of which shall be at the County Court House thereof. Such regulations when so posted shall be held to impart notice of their contents to all persons within this State, and shall be binding upon all persons.

SEC. 6. The said Board shall elect of their own number, or appoint from without their number, a competent person especially qualified by practical experience in horticulture for the duties of his office, who shall be known as Inspector of Fruit Pests (to hold office at the pleasure of the Board), whose duty it shall be to visit the horticultural districts of the State, to see that all regulations of said Board and provisions of law to prevent the spread of fruit pests and diseases of trees and plants injurious to the horticultural interests of the State, and all regulations of said Board in the nature of quarantining infected or infested districts, and also all rules and regulations of said Board concerning disinfection of fruits, trees, plants, grafts, scions, orchard debris, empty fruit boxes and packages, and other material dangerous to orchards, fruit, and fruit trees, are enforced. He shall, also, whenever required, and under the direction of the Board, and may also upon his own motion, and upon the complaint of interested parties, inspect orchards, nurseries, and other places suspected, or believed to be infested with fruit pests, or infected with contagious disease injurious to trees, plants, or fruits, and he shall report the facts to said Board. If, upon report of said Inspector, or from well attested facts otherwise before it, said Board shall be of the opinion that any locality, orchard, district, or place is infested with fruit pests, or infected with contagious disease injurious to trees, plants, or fruits, and liable to spread to other localities to the injury of other persons or places, said Board shall by an order entered upon its minutes, so declare, said and such infested or infected district or place shall be under the quarantine regulations of said Board. As soon, however, as in the opinion of said Inspector the danger from such locality has ceased, he may suspend said quarantine regulations, and shall immediately report the fact to the Board, who may approve or disapprove his action. He shall from time to time, and whenever required by said Board, report to it such information as he may acquire from observation, experience, and otherwise, as to the best modes of diminishing and eradicating fruit pests and diseases from orchards; and also suggestions in practical horticulture; the adaptation of products to soil, climate, and markets, and such other facts and information as shall be calculated to improve the horticultural interests of the State.

Sec. 7. The said Board, and, in case of necessity, during the recess of the Board, the said Inspector may appoint such quarantine guardians as may be needed to carry out the provisions of this Act, whose duties it shall be to see that the regulations of the Board and the instructions of the Inspector are enforced and carried out; they shall also report to said Inspector, or to the State Board, all infractions or violations of said directions, regulations, and of the law in regard to quarantine disinfection and destruction of pests, and precautions against the spreading pests and diseases. The salary of quarantine guardians shall not exceed two dollars per day, and shall be paid by the owners of orchards and other places and localities under quarantine regulations; and they may maintain an action therefor before any Justice of the Peace in any township in which any quarantined locality is wholly or in part situated. But in no case shall they have any claim upon the State for such services.

Sec. 8. It shall be the duty of the Secretary to attend all meetings of the Board, and to preserve records of its proceedings and correspondence; to collect books, pamphlets, periodicals, and other documents containing valuable information relating to horticulture, and to preserve the same; to collect statistics and other information showing the actual condition and progress of horticulture in this State and elsewhere; to correspond with agriculture and horticulture societies, colleges, and schools of agriculture and horticulture, and other persons and bodies, as he may be directed by the Board, and prepare, as required by the Board, reports for publication; he shall also act as assistant to and obey the directions of the Inspector of Fruit Pests in the exercise of the duties of his office, and shall be paid for his services as such Secretary and assistant a salary of not to exceed seventy-five dollars per month.

Sec. 9. The Inspector of Fruit Pests shall receive as compensation for his services not to exceed the sum of one hundred and fifty dollars per month, and his actual traveling expenses shall be allowed, not to exceed seven hundred and fifty dollars per annum; the other members of the said Board shall receive no compensation whatever.

Sec. 10. The Board shall biennially, in the month of January, report to the Legislature a statement of its doings, with a copy of the Treasurer's accounts for the two years preceding the session thereof, and abstracts of the reports of the Inspector of Fruit Pests and Secretary. Said report shall not exceed one hundred printed pages.

Sec. 11. The Treasurer shall receive all moneys belonging to the Board, and pay out the same only for bills approved by it, and shall annually render a detailed account to the Board.

Sec. 12. There is hereby appropriated for the uses of the State Board of Horticulture, as set forth in this Act, out of any moneys in the State Treasury not otherwise appropriated, the sum of five thousand dollars for the year commencing April first, one thousand eight hundred and eighty-three, and five thousand dollars for the year commencing April first, one thousand eight hundred and eighty-four, and the State Controller will draw his warrants upon the State Treasurer in favor of the Treasurer of said Board for the said sums, or any part thereof, when they become available, upon proper demand being made for the same by the said Board.

Sec. 13. This Act shall take effect and be in force from and after its passage, and all Acts or parts of Acts inconsistent or in conflict with the provisions of this Act are hereby repealed.

CHAPTER VII.

An Act to amend sections eight, nine, ten, eleven, and twelve of an Act entitled "An Act to create and establish a State Board of Horticulture, and appropriate money for the expenses thereof," approved March thirteenth, eighteen hundred and eighty-three.

[Approved February 18, 1885.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

Section 1. Section eight of said Act is hereby amended to read as follows:

Section 8. It shall be the duty of the Secretary to attend all meetings of the Board, and to preserve records of its proceedings and correspondence; to collect books, pamphlets, and periodicals, and other documents containing valuable information relating to horticulture, and to preserve the same; to collect statistics and other information showing the actual condition and progress of horticulture in this State and elsewhere; to correspond with agricultural and horticultural societies, colleges, and schools of agriculture and horticulture, and other persons and bodies, as he may be directed by the Board, and prepare, as required by the Board, reports for publication. He shall also act as assistant to and obey the directions of the Inspector of Fruit Pests in the exercise of the duties of his office, and shall be paid for his services as such Secretary and assistant a salary of one hundred and fifty dollars per month, to be paid as other State officers.

Sec. 2. Section nine of said Act is hereby amended to read as follows:

Section 9. The Inspector of Fruit Pests shall receive as compensation for his services the sum of two hundred dollars per month, to be paid as other State officers, and his actual traveling expenses shall be allowed, not to exceed one thousand dollars per annum. The members of the Board and Secretary shall receive their actual traveling expenses in attending semi-annual meetings of the Board.

Sec. 3. Section ten of said Act is hereby amended to read as follows:

Section 10. The Board shall, biennially, in the month of January, report to the Legislature a statement of its doings, with a copy of the Treasurer's accounts for the two years preceding the session thereof, and abstracts of the reports of the Inspector of Fruit Pests and Secretary.

Sec. 4. Section eleven is hereby amended to read as follows:

Section 11. The Treasurer shall receive all moneys belonging to the Board, and pay out the same only for bills approved by the Chairman of the Finance Committee, and shall annually render a detailed account to the Board.

Sec. 5. Section 12. There is hereby appropriated, for the uses of the State Board of Horticulture, as set forth in this Act, out of any moneys in the State Treasury not otherwise appropriated, the sum of ten thousand dollars for the year commencing April first, one thousand eight hundred and eighty-five, and ten thousand dollars for the year commencing April first, one thousand eight hundred and eighty-six, and the State Controller will draw his warrants upon the State Treasurer in favor of the Treasurer of said Board for the said sums, or any part thereof, when they become available, upon proper demand being made for the same by the said Board.

Sec. 6. This Act shall take effect immediately.

CHAPTER XXXVI.

An Act to prevent the spreading of fruit and fruit tree pests and diseases, and to provide for their extirpation.

[Approved March 10, 1885.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

Section 1. It shall be the duty of every owner, possessor, or occupier of an orchard, nursery, or land where fruit trees are grown within this State, to disinfect all fruit trees grown on such lands infested with any insect or insects, or the germs thereof, or infested by any contagious disease known to be injurious to fruit or fruit trees, before the removal of the same from such premises for sale, gift, distribution, or transportation. Fruit boxes which have been used for shipping fruit to any destination are hereby required to be disinfected previous to their being again used for any purpose; all boxes returned to any orchard, storeroom, salesroom, or any place used or to be used for storage, shipping, or any other purpose, must be disinfected within three days after their return; and any and all persons failing to comply with the requirements of this section shall be guilty of a misdemeanor. All packages, known as free packages, must be destroyed or disinfected before being again used.

Sec. 2. It shall be the duty of the owner, lessee, or occupier of any orchard within this State, to gather all fruit infested by the insects known as the codlin moth, peach moth, red spider, plum weevil, and kindred noxious insects, their larvæ or pupæ, which has fallen from the tree or trees, as often as once a week, and dispose of or destroy the same in such manner as to effectually destroy all such insects, their larvæ or pupæ. It shall be the duty of the Inspector of Fruit Pests, or the Quarantine Guardian, to inspect fruit packages, and all trees and plants, cuttings, grafts, and scions, known or believed to be infested by any insect or insects, or the germs thereof, or their eggs, larvæ, or pupæ, injurious to fruit or fruit trees, or infested with any disease liable to spread contagion, imported or brought into this State from any foreign country, or from any of the United States or Territories, and if, upon inspection, such fruit, or fruit packages, are found to be infested or infected, it shall be a misdemeanor to offer the same for sale, gift, distribution, or transportation, unless they shall be first disinfected.

Sec. 3. Every person shipping fruit trees, scions, cuttings, or plants, from any orchard, nursery, or other place where they were grown or produced, shall place upon or securely attach to each box, package, or parcel containing such fruit trees, scions, cuttings, or plants, a distinct mark or label, showing the name of the owner or shipper, and the locality where produced. And any person who shall cause to be shipped, transported, or removed from any locality declared by the State Board of Horticulture to be infested with fruit tree or orchard pests, or infected with contagious diseases injurious to trees, plants, or fruits, unless the same shall have been previously disinfected, shall be guilty of a misdemeanor. Disinfection shall be to the satisfaction of the State Board of Horticulture, or the Inspector of Fruit Pests. When disinfected, the fact shall be stamped upon each box, package, or separate parcel of fruit trees, scions, cuttings, or plants; and any person who shall cause to be shipped, transported, or removed, any such box, parcel, or package, from any quarantine district or locality, not bearing such stamp, shall be guilty of a misdemeanor, and may be punished by a fine, as provided in section six of this Act. Any person who shall falsely cause such stamp to be used, or shall imitate or counterfeit any stamp or device used for such purpose, shall be guilty of a misdemeanor.

Sec. 4. It shall be the special duty of each member of the State Board of Horticulture to see that the provisions of this Act are carried out within his respective horticultural district, and all offenders duly punished.

Sec. 5. All fruit trees infested by any insect or insects, their germs, larvæ, or pupæ, or infected by disease known to be injurious to fruit, or fruit trees, and liable to spread contagion, must be cleaned or disinfected before the first day of April, eighteen hundred and eighty-five, and on or before the first day of April of every succeeding year thereafter. All owners or occupants of lands on which fruit trees are grown failing to comply with the provisions of this section, shall be guilty of a misdemeanor, and fined as provided for in section six of this Act. All fruit, packages, trees, plants, cuttings, grafts, and scions, that shall not be disinfected within twenty-four hours after notice by the Inspector of Fruit Pests, or a duly appointed Quarantine Guardian, or any member of the Board of Horticulture, shall be liable to be proceeded against as a public nuisance.

Sec. 6. Any person or corporation violating any of the provisions of this Act shall be deemed guilty of a misdemeanor, and shall, on conviction thereof, be punishable by a fine of not less than twenty-five dollars nor more than one hundred dollars for every offense.

AN ORDINANCE

For the Destruction of Insects Injurious to Fruit and Fruit Trees.

RECOMMENDED FOR ADOPTION.

The Board of Supervisors of the County of —— do ordain as follows:

Section 1. Whenever a petition is presented to the Board of Supervisors of —— County, signed by five or more persons, who are resident freeholders and possessors of an orchard, stating that certain or all orchards or trees of any variety are infected with scale bug, codlin moth, or other insects that are destructive of trees, and asking the appointment of a commission to supervise the destruction of such insects, the Board of Supervisors shall, within twenty days after such petition is presented to the Board, appoint three Commissioners for the said county, to be known as the County Board of Horticultural Commissioners.

Sec. 2. The Commissioners shall hold their office for the term of three years, and until their successors are qualified; except that of the Commissioners first appointed one shall hold for one year, one for two years, and the third for three years. The Commissioners first appointed shall decide by lot which of them shall hold for one year, which for two years, and which for three years. After the first Commissioners are appointed, the Board of Supervisors shall appoint one Commissioner every year, such appointment to be made one month or thereabouts before the commencement of the term of the appointed.

Sec. 3. Any vacancy which may from any cause occur in the Commission shall be filled by appointment of the Board of Supervisors. The appointee to fill a vacancy shall hold for the balance of the unexpired term.

Sec. 4. Whenever the County Board of Horticultural Commissioners shall be informed by complaint in writing of any person residing in said county that an orchard, nursery, or trees, or any place in their jurisdiction, is infested with scale bug, codlin moth, red spider, or other noxious insects, liable to spread contagion dangerous to the trees or fruit of the complainant, or their eggs or larvæ injurious to fruit or fruit trees, they shall cause inspection to be made of the said premises. and if found infested they shall notify the owner or owners, or the persons or person in charge or possession of the said trees or place, that the same are infected with the said insects, or any of them, or their eggs or larvæ, and shall require such person or persons to disinfect the same within such reasonable time as they may direct, to be specified in the notice; such notice may be served by any Commissioner or any person deputed by the Commissioners for that purpose, and shall be served by delivering a copy thereof to such owner or persons having charge thereof, personally; *provided*, that when any person other than the owner is in possession or charge of such place the notice shall be served upon the owner, if within the county, as well as the person so in charge or possession of such premises.

SEC. 5. If within the time specified in said notice such disinfection has not been accomplished, then such person or persons shall be required by notice, to be served as hereinbefore provided, to make application of such treatment, applied in such manner and within such time as the Commissioners may prescribe, but subject to the general laws of the State of California.

SEC. 6. If the person so notified shall fail to disinfect such places or to apply such treatment in the manner and within the time prescribed in the notice, such orchards or nurseries or places shall be deemed a public nuisance, and may be proceeded against in any Court of competent jurisdiction, and abated as such nuisance either by the disinfection of such place under the direction of said commission or other public authority, or by the destruction thereof, when necessary to prevent the spread of such disease or pest.

SEC. 7. The cost and expense of such proceedings for the compulsory disinfection of such premises, including the expenses of disinfection when ordered, shall be in lieu upon said premises.

SEC. 8. Said Board of Commissioners shall have the power to divide the county into districts and appoint a local Inspector for each district, who shall perform such duties as may be required of him by the Board of Commissioners.

SEC. 9. Said County Board of Horticultural Commissioners shall perform such other duties as may be prescribed by law, and for a failure to perform such duties or any of their duties they may be removed by the Board of Supervisors upon complaint in writing.

SEC. 10. Each Commissioner shall receive —— dollars per day, and each local Inspector —— dollars per day, for his services for each day in which such Commissioner or Inspector is actually engaged in the performance of his duties; *provided*, that the total amount of expenditure for services of Commissioners and Inspectors shall not exceed in any one year the sum of —— dollars, without a special order of this Board to that effect.

SEC. 11. This ordinance shall take effect and be in force from and after the ———— day of ——, A. D. eighteen hundred and eighty ——; and prior to said day shall be published, with the names of the members voting for and against the same, for at least one week in the ——, a newspaper published in said county.

Dated ——, 188—.

————,
Chairman of the Board.

Attest:
————
Clerk.

REPORT OF THE TREASURER.

[SUBMITTED AND ADOPTED BY THE BOARD AT THE MEETING OF JULY 2, 1888.]

To the honorable the Officers and Members of the State Board of Horticulture of the State of California:

GENTLEMEN: I herewith submit to your kind consideration and approval this, my biennial report as your Treasurer.

The following amounts have been paid by me within the past year, to cover claims, as follows:

July.		
Political Record, subscription one year	$2 50	
Dutton & Partridge, two boxes of pens	2 00	
Patron Publishing Company, printing, etc.	7 00	
A. Carlisle & Co., supplies	75	
F. Chester, rent of office	40 00	
B. M. Lelong, office expenses	7 00	
A. Roman, books	26 00	
		$85 25
August.		
H. S. Crocker & Co., printing and supplies	$58 75	
A. Roman, books, etc.	32 00	
James Duffy & Co., carpets, etc.	215 10	
Swan & Stein, painting	16 25	
Dutton & Partridge, supplies	21 08	
Osborn & Alexander, hat hooks	3 75	
B. M. Lelong, office expenses	27 70	
W. G. Klee, traveling expenses	22 60	
A. Hayward, rent of office	85 00	
Samuel Carson & Co., books	14 50	
A. Carlisle & Co., stationery	4 10	
Geo. E. Colby, two analyses	10 00	
San Francisco Examiner, one year	7 80	
San Francisco Chronicle, one year	7 80	
Delta Publishing Company, Delta, one year	2 00	
Pacific Fruit Grower, one year	1 50	
Southern California Planter, one year	1 50	
Rural Californian, one year	1 50	
Sacramento Bee, one year	6 00	
Los Angeles Herald, one year	8 00	
Pacific Rural Press, one year	3 00	
Times-Mirror Company, printing programmes	12 00	
E. A. Schnieder, two analyses	20 00	
Dutton & Partridge, stationery	65 95	
W. G. Klee, traveling expenses	44 55	
B. M. Lelong, office expenses	95 15	
		$787 58
September.		
Dutton & Partridge, stationery	$29 30	
Arthur M. Ebbetts, coal	4 50	
Sacramento Record-Union, one year	6 00	
Union Box Factory, 100 boxes	37 00	
Marysville Appeal, one year	6 00	
W. G. Klee, traveling expenses	94 05	
B. M. Lelong, office expenses	154 70	
A. Hayward, rent of office	85 00	
San Francisco Call, one year	7 80	
N. P. Cole & Co., one desk	82 40	
Samuel Carson & Co., one book	3 00	
Geo. E. Colby, four arsenic tests	20 00	
Thomas Parsons, Janitor	7 50	
		$537 25

October.

Swan & Stein, painting sign	$4 50	
Thomas Parsons, Janitor	7 50	
Clara A. Brockman, clerical work	30 00	
A. Hayward, rent of office	85 00	
Dutton & Partridge, supplies	12 25	
W. G. Klee, traveling expenses	19 25	
B. M. Lelong, office expenses	405 97	
		$564 47

November.

Dutton & Partridge, stationery	$31 45	
Samuel Carson & Co., books	27 50	
N. P. Cole & Co., umbrella stand	3 75	
H. S. Crocker & Co., supplies	19 00	
Swan & Stein, painting	4 50	
A. Hayward, rent of office	85 00	
W. G. Klee, traveling expenses	104 25	
Thomas Parsons, Janitor	7 50	
Clara A. Brockman, clerical work	30 00	
A. K. Whitton, reporting Eighth Convention	225 00	
N. R. Peck, traveling expenses	37 05	
M. G. Vallejo, traveling expenses	31 35	
A. Scott Chapman, traveling expenses	65 90	
A. Block, traveling expenses	25 85	
Ellwood Cooper, traveling expenses	62 50	
W. M. Boggs, traveling expenses	26 35	
B. M. Lelong, office expenses	138 20	
Dr. Edwin Kimball, traveling expenses	21 65	
		$946 80

December.

H. S. Crocker & Co., stationery	$9 50	
Geo. E. Colby, arsenic test	5 00	
Dutton & Partridge, supplies	12 65	
W. G. Klee, traveling expenses	34 00	
B. M. Lelong, office expenses	75 80	
Samuel Carson & Co., books	10 50	
L. A. Berteling & Co., one barometer	16 00	
James Duffy & Co., one pole and curtain	6 50	
N. P. Cole & Co., one chair	6 50	
Clara A. Brockman, clerical work	40 00	
Thomas Parsons, Janitor	7 50	
A. Hayward, rent of office	85 00	
		$309 20

January.

Alta California, one year	$5 40	
H. S. Crocker & Co., supplies	16 75	
Dutton & Partridge, stationery	15 78	
Swan & Stein, painting	2 00	
James Duffy & Co., repairing carpets, etc.	7 50	
Arthur M. Ebbetts, coal	7 15	
Samuel Carson & Co., books	3 00	
Clara A. Brockman, clerical work	40 00	
Thomas Parsons, Janitor	7 50	
A. Hayward, rent	85 00	
B. M. Lelong, office expenses	34 35	
W. G. Klee, traveling expenses	50 10	
N. P. Cole & Co., one rocker and one table	6 00	
		$280 53

February.

Samuel Carson & Co., books	$6 50	
Dutton & Partridge, supplies	10 82	
Thomas Parsons, Janitor	7 50	
Swan & Stein, painting	12 00	
Osborn & Alexander, one stepladder	3 20	
Clara A. Brockman, clerical work	40 00	
A. Hayward, rent of office	85 00	
N. P. Cole & Co., one table	8 00	
W. G. Klee, traveling expenses	58 35	
B. M. Lelong, office expenses	75 70	
		$307 07

March.		
Dutton & Partridge, supplies	$0 75	
Thos. Parsons, Janitor	7 50	
Arthur M. Ebbetts, coal	4 00	
A. Hayward, rent of office	85 00	
B. M. Lelong, office expenses	69 45	
		$166 70
April.		
H. S. Crocker & Co., supplies	$15 00	
Dutton & Partridge, stationery	14 85	
N. P. Cole & Co., furniture (one desk, one cabinet, one table)	102 50	
Samuel Carson & Co., books	4 80	
James Duffy & Co., papering	6 08	
Giles Lithograph and Liberty Printing Co., lithographic plates	153 90	
A. K. Whitton, reporting Ninth Convention	200 00	
Minnie V. Cox, sketching	60 00	
Los Angeles Tribune, one year	7 00	
Patten & Holstein, wood cuts	51 00	
Geo. Harold Ward, clerical work	25 00	
Thos. Parsons, Janitor	7 50	
A. Hayward, rent of office	85 00	
A. S. Chapman, traveling expenses	33 50	
Sol. Runyon, traveling expenses	76 00	
N. R. Peck, traveling expenses	57 85	
W. G. Klee, traveling expenses	86 75	
B. M. Lelong, office expenses	114 21	
		$1,100 94
May.		
Thos. Parsons, Janitor	$7 50	
Geo. Harold Ward, clerical work	25 00	
A. Hayward, rent of office	85 00	
James Duffy & Co., papering	17 75	
Dutton & Partridge, supplies	48 80	
Ellwood Cooper, traveling and incidental expenses	24 85	
W. G. Klee, traveling expenses	17 80	
B. M. Lelong, office expenses	65 88	
		$292 58
June.		
The J. Dewing Company, one book	$8 00	
L. Ph. Bolander, fumigating apparatus	57 00	
James Duffy, carpet, etc.	15 60	
Neville & Co., cover for trees, etc.	42 25	
Swan & Stein, painting large street sign	16 00	
Thomas Parsons, Janitor	7 50	
George Harold Ward, clerical work	25 00	
A. Hayward, rent of office	85 00	
Dutton & Partridge, supplies	29 13	
N. P. Cole & Co., one pedestal and one table	45 00	
W. G. Klee, traveling expenses	21 35	
B. M. Lelong, office expenses	69 80	
		$421 63
Salary of Inspector, twelve months		2,400 00
Salary of Secretary, twelve months		1,800 00
Total		$10,000 00
State appropriation		$10,000 00

SUPPLEMENTARY REPORT.

The amounts below are the total expenditures for the thirty-eighth and thirty-ninth fiscal years. In furnishing you with the following table of expenses, I desire to say that I do so to show you the rapid increase of the business of this department. This also indicates the rapidity in which the industry has increased in this State within the past year.

I desire also to mention that in the months of April, May, and June, 1887, there were no funds or appropriation for this Board to draw upon for any expense whatever, and the office should have been closed during this time, but the Secretary paid for all expenditures, and the business of the Board was conducted through those months without any further aid.

The Inspector of Fruit Pests also carried on his investigations during that time without being compensated for all materials purchased, etc.

The horticultural pursuits in this State are very rapidly increasing, and never before has such a rapid increase been witnessed as that of the past two years. The mailing list of this office in 1885 was about seven thousand five hundred; the mailing list of the present year numbers over twelve thousand. Therefore the time has arrived when a larger appropriation is needed, or with such a rapid increase, it will be impossible for this Board to keep within bounds of the present appropriation, which is entirely inadequate to its wants. Having to move into larger quarters, our rent became more than double than formerly, as also our freight, express, and postage bills, as the following figures show:

Thirty-eighth Fiscal Year.

Printing	$2 75
Furniture	42 50
Papers, subscription to	15 20
Telegrams	90
Coal	16 75
Books	241 60
Expressage	27 07
Postage stamps	56 05
Messengers	14 00
Spraying apparatus	4 50
Microscope	250 00
Stenographer	225 00
Lithographing	470 00
Janitor, twelve months	62 00
Rent—eleven months at $30, and one month at $40	370 00
Traveling expenses of the Commissioners	442 52
Traveling expenses of the Inspector of Fruit Pests	782 45
Salary Inspector of Fruit Pests	2,400 00
Salary Secretary	1,800 00
Sundries	14 00
Total	$7,237 29
State appropriation	$10,000 00
Balance turned back into Treasury	$2,762 71

Thirty-ninth Fiscal Year.

Printing	$153 50
Furniture	469 73
Papers, subscription to	91 77
Telegrams	18 55
Coal	15 65
Books	313 57
Expressage	170 13
Postage stamps	650 78
Messengers	3 65
Spraying and gas apparatus	81 15
Stenographer	425 00
Lithographing	153 90
Janitor, twelve months	98 30
Rent—one month at $40, eleven months at $85	975 00
Traveling expenses of the Commissioners	430 00
Traveling expenses of Inspector of Fruit Pests	533 70
Sketching	60 00
Wood cuts	51 00
Electrotype cuts	10 85
Cartage	51 55
Carpenter work	113 00
Chemist	55 00
Clerk salary, six months	210 00
Office boy, four months	95 00
Freight	105 39
Painting	73 75
Stationery	261 13
Gas	6 55
Extra help	30 50
Boxes for sending out reports	37 00
Papering	25 25
Window awnings	26 00
Sundries	13 65
Salary, Inspector of Fruit Pests	2,400 00
Salary, Secretary	1,800 00
Total	$10,000 00
State appropriation	$10,000 00

I desire to say, in conclusion, that it is needless to mention that the limited funds at our command have been very economically and judicially expended, as the above figures show.

Before closing, I desire to extend my warmest thanks to our esteemed President and my colleagues for their uniform courtesy, friendship, and regard to one who has been their Treasurer, and who has acted in that capacity for the best interests subserved since the inception of this Department.

Very respectfully submitted.

M. G. VALLEJO, Treasurer.

REPORT OF THE SECRETARY.

[SUBMITTED AND APPROVED BY THE BOARD AT THE MEETING OF JULY 2, 1888.]

To the honorable the Officers and Members of the State Board of Horticulture of the State of California:

GENTLEMEN: I herewith submit to your kind consideration this, my report for the thirty-ninth fiscal year, just closed.

PUBLICATIONS.

During the past year many reports and bulletins have been issued by this Board, which have been of great value to the horticulturists of this State; besides these, there have been issued monthly bulletins of inquiry, and by so doing we have been enabled to report the condition and progress of the industry in every month of the year. The reports published within the past year are as follows:

Biennial Report for 1885 and 1886, with Appendix for 1887. Ten thousand copies.

Synopsis of the Proceedings of the Eighth Fruit Growers' Convention, held at Santa Rosa, November, 1887. Five thousand copies.

A Treatise on Citrus Culture in California, by the Secretary. Five thousand copies.

Bulletin on Remedies Recommended at the Seventh State Convention of Fruit Growers. Five thousand copies.

Bulletin on Remedies Recommended at the Eighth State Convention of Fruit Growers. Five thousand copies.

Bulletin on Olive Culture, by the President. Five thousand copies.

Bulletins Nos. 4, 5, 6, and 7, by the Inspector of Fruit Pests. Of each, five thousand copies.

Official Report of the Ninth State Fruit Growers' Convention. Five thousand copies.

These publications have been mailed to all those who have applied for them, and to those on the regular mailing list; copies have also been sent to all public institutions in this State. I have also exchanged with all the horticultural societies and colleges of agriculture in the Eastern States, and with many such institutions in foreign countries.

The demand for these reports in this State has been very large, and the reports being so large and heavy the postage on them has been very great. The demand for them still continues and applications are received daily. The issue of 1885–6 is nearly exhausted; there are still in this office a few copies for distribution and for use of the incoming Legislature. A great many applications are received from other States almost every day, and also from foreign countries, but in the absence of special directions in the statutes, I have had to exercise discretion in the mailing of reports to persons outside of the State, and believing that said reports are for this State only, and for this and other good and sufficient reasons, many applications from other States have not been filled.

OUR THIRD BIENNIAL REPORT.

Our biennial year has just closed, and on or about August first I will forward to the State Printer, to be printed, the biennial report of this Board for the years 1887 and 1888. In justice to myself and the State Printer, I ask that all reports and essays to be embodied in said report be presented to the Secretary before the twentieth of the present month.

This will be a valuable edition, as it will contain the reports of the State Inspector of Fruit Pests, in which will be given the description of the various new insect pests discovered in the past year, with illustrations of the same, and also all remedies experimented with, and the results thereof.

This work will not only be instructive, but will be a guide for amateurs in the study of entomology. It will also contain the report of the Treasurer and the report of the Secretary.

Besides these there will be other very important papers on different subjects, with illustrations of new fruits and several colored lithographic chromo plates; also the official report of the proceedings of the Eighth and Ninth State Fruit Growers' Convention. I expect to have this most valuable edition ready for distribution before the meeting of the incoming Legislature.

A TREATISE ON CITRUS CULTURE.

There being considerable inquiry about the propagation of citrus fruits, and of varieties, lemon curing, etc., and as no book has been published treating on the latest improved methods of curing, etc., I imposed the task upon myself, and have prepared a little book on the subject, of which there have been printed five thousand copies. In its preparation I devoted all my spare time, which was very limited, but by giving part of my time to it evenings I succeeded in its completion. The thanks of this Board are due to the Superintendent of the State Printing Department for the able manner, neatness, and promptness in which this work was executed.

A REVISED EDITION.

I will soon commence to work on a revised edition, which I may possibly complete before the end of the present fiscal year. While these investigations have greatly added to my duties, they have not been without interest, and I am happy if anything I have accomplished has aided the progress of horticulture in the arrangement of those chapters.

REPORTS RECEIVED.

The following reports have been received in exchange with the Horticultural Societies in the Eastern States and elsewhere; also, Colleges of Agriculture, etc. These reports have greatly added to the value of our library, as they contain the proceedings in full of all the horticultural meetings held in the Eastern States within the past four years, and also information on almost every subject bearing on horticulture:

Illinois State Horticultural Society, 1886-8.
Iowa State Horticultural Society, 1886-8.
Indiana State Horticultural Society, 1886-7.
Kansas State Horticultural Society, 1886-8.
Arkansas State Horticultural Society, 1886-8.
Michigan State Horticultural Society, 1887.
Massachusetts State Horticultural Society, 1886-8.
Massachusetts College of Agriculture, 1886-8.
Colorado State Horticultural Society, 1886-7.
California Agricultural Society, 18 volumes, from 1859 to 1888.
Michigan State Horticultural Society, 1886-7.
Kentucky State Horticultural Society, 1886-8.
University of California, 1886-8.
Ohio State Horticultural Society, 1886-8.

Minnesota State Horticultural Society, 1886-8.
Missouri State Horticultural Society, 1886-8.
Mississippi State Horticultural Society, 1886-8.
Smithsonian Institute, 1885-6-7-8.
Nebraska State Horticultural Society, 1886-8.
Department of Agriculture, 1886.
New Jersey State Horticultural Society, 1886-8.
Entomologist of New York, 1885-6.
Entomological Society of Ontario, 1887.
Entomologist of the State of Illinois, 1886-8.
Georgia State Horticultural Society, 1886-8.
Statistician, Washington, 1887.
Arsenical Poisons, by S. A. Forbes, 1887.
Bureau of Animal Industry, 1887.
North Carolina Fruit Growers' Association, 1886-8.
Forestry in Europe—Reports by the United States Consuls.
Gulf States Fruit Growers' Association, 1886-8.
Royal Horticultural Society of Victoria.
Western Tennessee Horticultural Society, 1886-8.
Royal Commission on Vegetable Products of Victoria, 1886.
Wisconsin State Horticultural Society, 1886-7.
North Carolina State Horticultural Society, 1886-7.
Western New York Horticultural Society, 1886-8.
Horticultural Products of Paris, by Chas. Joly, 1888.
Northern Illinois Horticultural Society, 1886-7.
Statistical Abstract of the United States (Ninth Number), 1888.
Central Illinois Horticultural Society, 1886-7.
Montreal (Quebec) Horticultural Society, 1886-8.
Northern Texas Horticultural Society, 1886-8.
American Pomological Society, 1886-7.
American Forestry Congress, 1886.
American Horticultural Society, 1886.
Western Mission Horticultural Society, 1886.
Forestry in Kansas, 1886.
Nova Scotia Fruit Growers' Association, 1886.
Fungus Diseases of the Vine, by F. Lawson Scribner, 1888.
Abbottsford (Quebec) Fruit Growers' Association, 1886.
Railroad Commission of California, 1887.
Labor Commissioner of California, 1886.
Fruit Growers' Association of Ontario, 1886.
Bulletin No. 1, Department of Agriculture, 1888.
Report of Department of Agriculture, 1887.
Report of University of Illinois, 1888.
Consular Reports, full set, 90 vols.

COUNTY HORTICULTURAL SOCIETIES.

There being no Horticultural Societies or Clubs in many fruit-growing counties throughout the State, I have been unable to ascertain the fruit prospects of those counties when most needed, or to impart information to them at the proper time.

The formation of local bodies is of the utmost importance, as there is many a problem that confronts the orchardist that they could well counsel over with profit to themselves; I therefore urge the formation of Horticultural Societies or Clubs in all districts where fruits of any kind are grown, and, when thus organized, to forward to this office the name of the organization, name and the addresses of its officers, to be placed upon a register kept for that purpose.

CORRESPONDENCE.

The correspondence for the last year has by far exceeded my power to answer in full detail with the limited time and assistance at my command. There has been considerable inquiry upon all subjects from every part of this State, and from many other States and foreign countries. The correspondence with Ministers and Consuls in foreign countries has been with a view of ascertaining all the information upon kindred subjects that would aid the horticulturists of this State. This information I had intended to publish in our forthcoming biennial report, but as considerable time is required to obtain the same, it will appear later in pamphlet form.

MEMORIALS TO CONGRESS.

In accordance with resolutions adopted at the various Conventions assembled at Riverside, April, 1887, at Santa Rosa, November, 1887, and at Santa Barbara, April, 1888, I have forwarded to all the Senators and Representatives at Washington copies of the various resolutions adopted. I have received answers from many of them, especially from the Senators and Representatives of our State, that they would give the various matters their consideration.

DEFICIENCY BILLS.

In accordance with your instructions of last meeting, I forwarded to the State Board of Examiners all the deficiency bills, to the amount of $1,145 83, together with the following:

San Francisco, December 20, 1887.

Honorable State Board of Examiners:

Gentlemen: Inclosed please find demands against the State Board of Horticulture, contracted by said Board by mistake between April and July 1, 1887, during which time the said Board had no funds to draw upon for any expense whatever, the last appropriation having exhausted April 1, 1887, and the new appropriation not becoming available until July 1, 1887. It was in this hiatus that these bills were contracted. The Board, at their meeting held in this office November 7, 1887, passed the following resolution:

"*Resolved*, That the Secretary be instructed to forward all the bills contracted between April 1 and July 1, 1887, to the honorable the State Board of Examiners, with the request that the same be approved by them, and that they transmit the same to the Legislature as deficiency bills against this Board."

The bills are as follows:

F. Chester, for rent May and June, 1887	$80 00
California Patron, one year's subscription	2 00
Wm. McDonald, Janitor for April	5 00
J. Chester, office expenses	10 70
R. H. Follis, rent for April, 1887	30 00
A. S. Chapman, traveling expenses	45 00
A. Block, traveling expenses	64 45
Ellwood Cooper, traveling expenses	66 53
J. Chester, traveling expenses	71 75
E. Kimball, traveling expenses	75 20
N. R. Peck, traveling expenses	89 00
M. G. Vallejo, traveling expenses	107 20
L. M. Holt, incidental expenses	148 00
J. Barrows, reporting Seventh Convention	150 00
W. G. Klee, traveling expenses	201 00
Total	$1,145 83

I hope that the above claims will receive your unanimous approval, and that you will recommend their payment to the Legislature.

Very truly yours,

B. M. LELONG, Secretary.

Since then I received information through their Secretary that the bills have been passed upon, and that they would be transmitted to the Legislature, with the recommendation that they be paid, and that interest be allowed on them from the time they were contracted.

FURNITURE.

The following articles have been added to the rooms within the past year; the utmost care has been exercised in whatever has been purchased, that they be of the best quality and most serviceable as well as ornamental.

The system I have adopted in keeping the rooms in order works to perfection, *i. e.*, allowing nothing to be misplaced:

One large desk for the Secretary.
One chair for the Secretary.
One cabinet desk for the Inspector.
One microscope stand for the Inspector.
One chair for the Inspector.
One minor stand for the Inspector.
One table for the Inspector.
One water filter and stand.
One type-writer.
One table for type-writer.
One table for committee room.
Two tables for newspapers.
One blackboard.
Two frames for chromo lithographs (orange plates).
One frame (engraving).
One frame (Governor Waterman's picture).
One copying press.
One copying press stand.
One umbrella stand.
One clock.
One barometer.
One balance.
One President's stand.
One flagpole.
One flag.
One large street sign.
One specimen cabinet.
One pedestal.
One department seal
One truck.
One stepladder.
One packing table.

Besides these many small articles have been bought which were absolutely necessary; also the fine carpet that adorns the rooms. The rooms are always kept in the order that you now find them.

NEW BOOKS.

The following list of new books has been added to the library within the past year; the volumes are mostly large books:

Encyclopædia Britannica, vols. 21, 22, and 23.
Encyclopædia Americana, vols. 1, 2, and 3.
The Riverside Natural History, by John Sterling Kingsley, 6 vols.
Hand Book on Orange Culture, by T. W. Moore.
Orange Culture, by T. A. Garey.
The Rose Culture, by Ellwanger.
Floriculture, by Peter Henderson.
Orange Culture, by W. A. Spaulding.
Treatise on Citrus Family, by Geo. Gallesio.
Treatise on Olive Culture, by Adolph Flamont.
Half Hour with Insects, by Packard.
New Zealand Scale Insects, by Maskell.
Guide to Study of Insects, by Packard.
American Newspaper Annual, 1887.
Entomology (in German), by Brebms.
San Francisco Directory, 1887 and 1888.
Pacific Coast Directory, 1887 and 1888.
Strawberry Culture, by Barnard.
Fruit Culture, by Barry.
Practical and Scientific Fruit Culture, by Baker.
Queensland's Horticultural Industries, by Bernays.
Fruit Preserver's Manual, by Culver.
American Fruit Book, by Cole.
Orange Culture, by Davis.
Selected Fruit, by Downing.
English Plant Names, by Earl.

Small Fruit Culture, by Fuller.
Practical Floriculture, by Fumer.
Florida Fruits, by Harcourt.
Strawberry Culture, by Longworth.
The Orchard, by Rivers.
Chemistry, by Stockhardt.
Cryptogamic Botany, by M. C. Cooke.
Microscope Fungi, by M. C. Cooke.
Insect World, by Figuirer.
Arcana Entomology, by Westwood, 2 vols.
Wonder of Insect Life, by Willet.
Oliver Culture, by Cooper.
Olive Culture, by Pohndorff.

Codes.

Second California Civil.
Third California Statutes.
Fourth California Penal.
Fifth California Statutes.
Sixth California Statutes.
Seventh California Statutes.
Political, 1885.
Civil Procedure, 1885.

Reports, Books, etc., Distributed and in Library.

Total number of books, reports, etc., in the library, 2,474.
Total number of reports, treatises, etc., on hand for distribution, 16,800.
Total number of reports, treatises, etc., distributed in the past year, 15,200.
Total number of bulletins distributed in the past year, 35,000.
Total number of bulletins on hand for distribution, 4,000.
Total number of circulars issued, 45,000.

Agricultural and Horticultural Papers.

American Agriculturist.
Alhambra.
Canadian Horticulturist.
California Fruit Grower.
California Florist.
Country Gentleman.
Farm and Home.
Farmer and Fruit Grower.
Farm and Garden.
Farmers' Home Journal.
Farmers' Review.
Farm and Fireside.
Green's Fruit Grower.
Indiana Farmer.
Kansas City Journal and Agriculturist.
Prairie Farmer.
Pacific Rural Press.
Pacific Fruit Grower.
Rural Home.
Rural New Yorker.
The Ladies' Floral Cabinet.
The World.
The (Redlands) Citrograph.
Riverside Press.
Santa Clara Valley.

LITHOGRAPHIC PLATES.

I would recommend that you lay aside a sum not less than $1,000 for the purpose of illustrating new fruits, etc., for the biennial report, provided this work cannot be done by the State Printing Department.*

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* Referred to the Executive Committee, with full power to act. The committee approved of the recommendation.

CRYSTALLIZED FRUITS.

I have tried in every possible way to furnish the public with all the information I could obtain in the methods of crystallizing fruits, etc.

In view of the fact that the method is kept a secret, I have offered a premium of $20 for the best paper on crystallizing fruits,* and $10 for the second best paper, the papers to be read before you, and that you decide who is entitled to the prize; the papers to contain not less than one thousand five hundred words, and to give the method of crystallizing in full.

STATE CONVENTION OF FRUIT GROWERS.

The fruit growers of California, in Convention assembled at Santa Barbara, April, 1888, adopted by unanimous vote a resolution requesting your honorable body to hold the next Convention of fruit growers in the town of Chico, in November next. In considering this resolution, and, if approved, I would recommend that committees be appointed, and also essayists.†

COMMITTEES.

There should be at this time two legislative committees appointed—one to frame a bill to be presented to the Legislature on general laws relating to insect pests, etc.; the other on appropriation and revision of the present laws, etc. Similar bills failed to pass at the last meeting of the Legislature. This was partly due to the fact that the committees in charge did not act until very late, and so were unable to have the bills introduced at the early opening of the session. I would, therefore, recommend their appointment at this meeting.

SEAL.

I have designed a seal for the use of this department, and I recommend its adoption.‡

WHAT WE NEED AND SHOULD HAVE.

I believe that the law governing this Board should be so amended, and an appropriation made for the following purposes:

First—To employ an Agricultural Chemist, whose duties should be to carry on experiments with remedies, compounds, etc., throughout the year, in various sections of the State. This is of the greatest importance, for it is a fact that orchardists, as competent as they are, often destroy the effectiveness of many experiments made by them, for the reason that they are not competent to judge what chemical it is that destroys the one they have been so successful with. As evidence of this, I need only cite the instance where in Los Angeles County many fruit growers carried on a series of experiments for several years, although they succeeded in discovering many cheap and effective remedies, were at a loss to know how to further the ones they had so found, and in trying to do so destroyed the value of the former. This was so with the gas remedy. After they had found the chemical that was effective, they could not go ahead because they did not know how to prevent it from injuring the tree; this remained so until the services of a chemist were sought. The chemist, knowing his business, at once knew what to do, and accomplished what was desired, *i. e.*, the killing of the insects without injuring the tree or foliage.

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*The Board awarded the premium to J. J. Pratt, of Yuba City. See supplement to report of Secretary.

†The Board resolved to hold the next Convention at Chico, and instructed the Executive Committee to make all the necessary arrangements.

‡Adopted.

I have from time to time received communications from fruit growers, offering to donate to the Board plots of infested orchards where experiments could be carried on.

Monthly reports could be published, giving the results of all experiments made.

Second—Statistical correspondents.

I cannot find the means by which I can collect reliable information of the actual condition of the horticultural interests of the State, and also statistics. I have tried every possible way. Not being able to leave the office, I tried to do so by correspondence, but regret to say that my efforts in this direction have been in vain, as few people can be had who will devote part of their time to the answering of many impertinent questions without compensation; therefore, I believe that the Legislature should be appealed to for aid in the establishment of statistical correspondents throughout the State. Believing these matters to be of the utmost importance, I submit them to your kind consideration.

INSPECTOR OF FRUIT PESTS.

It is hardly necessary for me to comment upon the valuable services performed by this officer, as you are, no doubt, well aware of the great amount of knowledge he has disseminated throughout the State. In his department much has been accomplished in the past two years. In fact, that orchardists have succeeded, by his aid, in saving 90 to 98 per cent of their crops, is enough to substantiate this statement, and therefore needs no comment from me. He is now experimenting in propagating parasites, which, in their native countries, have kept the baneful insect pests among us in check. Already various lots have been imported, with a view of distributing them throughout the State as soon as it is known that they accomplish the purpose intended. He has also constructed an apparatus for fumigating trees with chemical gases, which is the most complete of its kind ever made, and is now carrying on a series of experiments to further, if possible, this most important remedy.

I have, at all times, received from him very kind and prompt assistance on many matters not directly of my department. For this I owe him my many thanks, and I cheerfully bear testimony to the faithfulness, efficiency, and discretion which has characterized the labors of your efficient Horticultural Officer.

STATE DEPARTMENTS.

My thanks are due to the various departments at Sacramento, their clerks and deputies, for the valuable assistance in furnishing me with information which they have at all times been ready to impart.

THE OFFICE.

I have felt the gravity of the responsibility which has been delegated to me, and have moved with the most careful and earnest desire to accomplish all that in me lay to bring out of the situation the largest and best results attainable. What might have been done had the demands of this Board been sustained by the Legislature, as they had a right to expect, and as the true interests of their constituents demanded, I leave you to discern.

AN EXECUTIVE SESSION.

I have other important matters to lay before you, but as I do not know whether you desire to make them public, I would recommend that after you have heard the reports of the various officers that you resolve yourself into an executive session to consider them.

CONCLUSION.

I cannot close this brief report of the doings of this department without recognizing the very valuable assistance and uniform courtesy shown me by our esteemed President and the honorable Commissioners while in the discharge of my official duties as Secretary. In expressing a proper sentiment of pleasure, such as it gives one like myself under like circumstances, even the pen often fails to properly perform its duty—such is this case—and I will therefore close, simply thanking them, but taking this opportunity to express my high appreciation for the valuable services they have gratuitously rendered the public.

Very respectfully submitted.

B. M. LELONG, Secretary.

SUPPLEMENT

TO THE

Report of Secretary of the State Board of Horticulture.

The Olive, the Orange, the Lemon, Deciduous Fruits, Etc.

EXPLANATION OF PLATES TO REPORT OF SECRETARY.

PLATE NO. 1.

Valencia Late Orange.—Section cut crosswise shows thickness of rind, texture, and quantity of seeds generally found in specimens. The picture is natural size.

PLATE NO. 2.

Maltese Blood Orange.—Section cut crosswise shows thickness of rind, and as they generally are, "seedless," and with blood-mottled flesh.

PLATE NO. 3.

Paper Rind St. Michael.—Section cut crosswise shows the amount of seeds they generally contain, also thinness of rind, and natural size of fruit.

PLATE NO. 4.

The Olive.—	Fig. A.	Branch of Mission olive, showing size of fruit.
	Fig. B.	Mission olive, cut lengthwise, showing size of pit, and thickness of flesh.
	Fig. C.	Picholine olive, natural size.
	Fig. D.	Picholine olive, showing size of pit, also thickness of flesh.
	Fig. E.	Pendoulier* olive, natural size.
	Fig. F.	Pendoulier olive, natural size, showing thickness of flesh, curve, and size of pit.

I am under great obligations to Minnie V. Lelong, artist, No. 325 Golden Gate Avenue, San Francisco, for the above paintings, taken from nature. They are as correct as they can possibly be made. (Secretary.)

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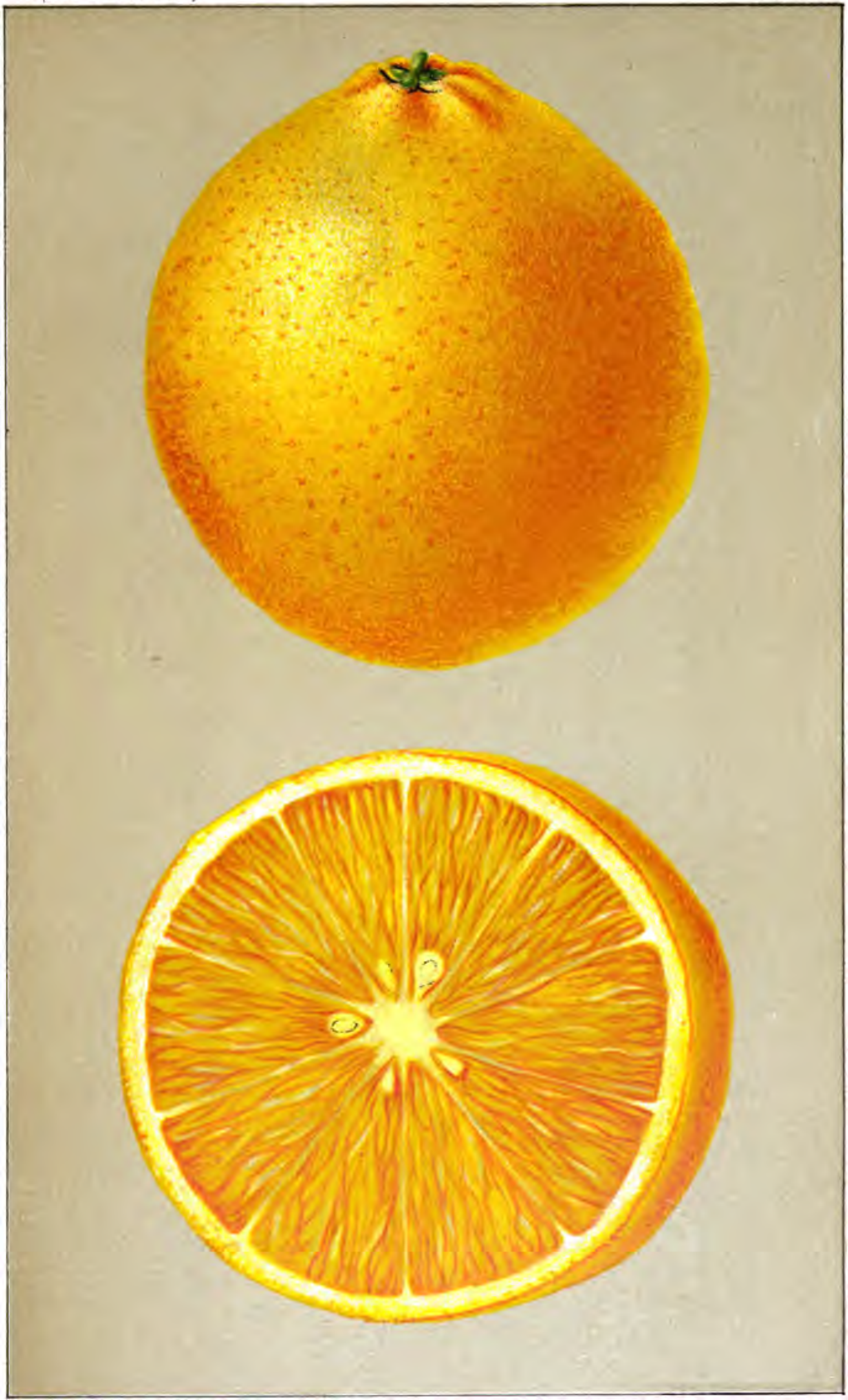
* Incorrectly spelled "Pendulier."



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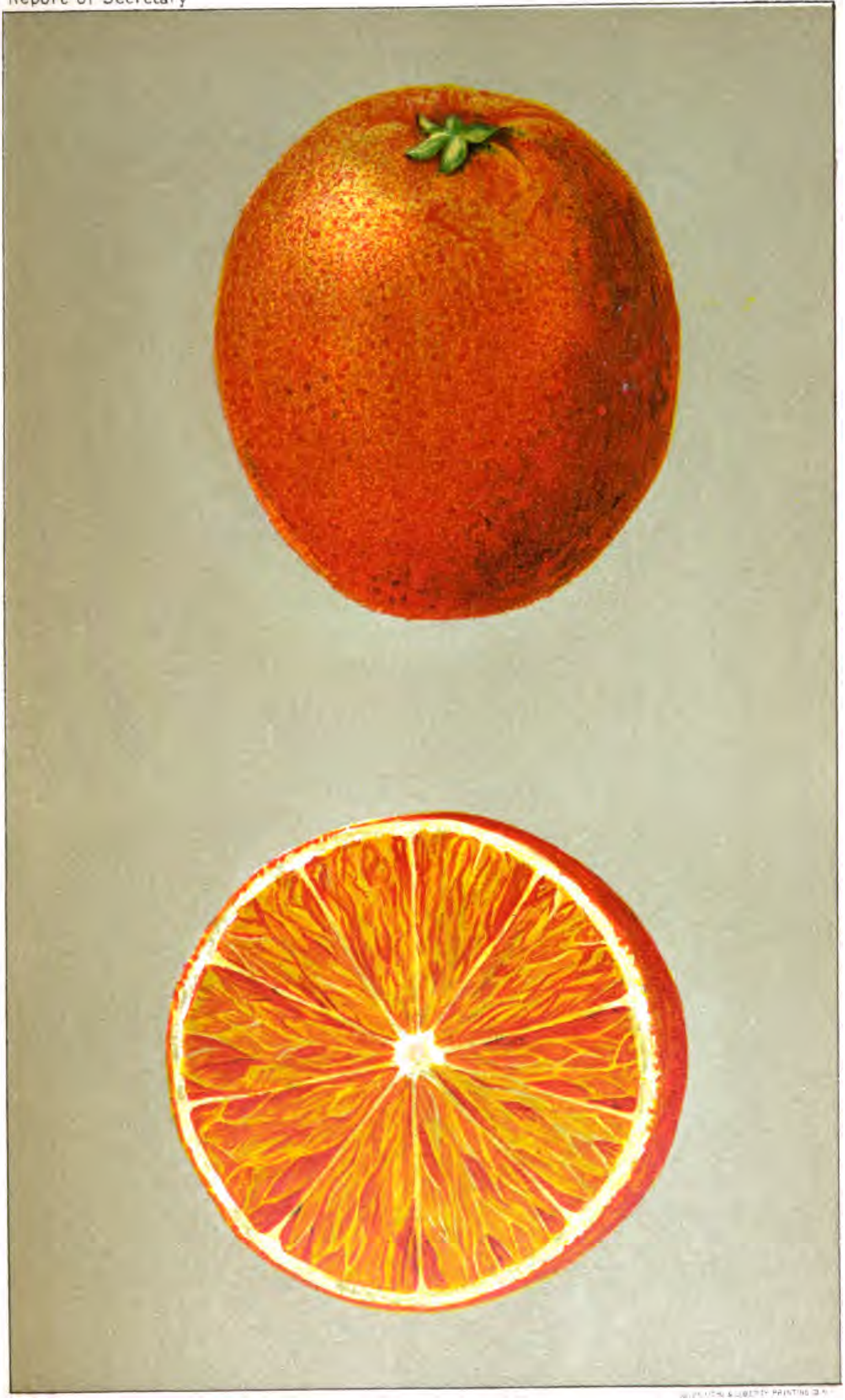
VALENCIA LATE.



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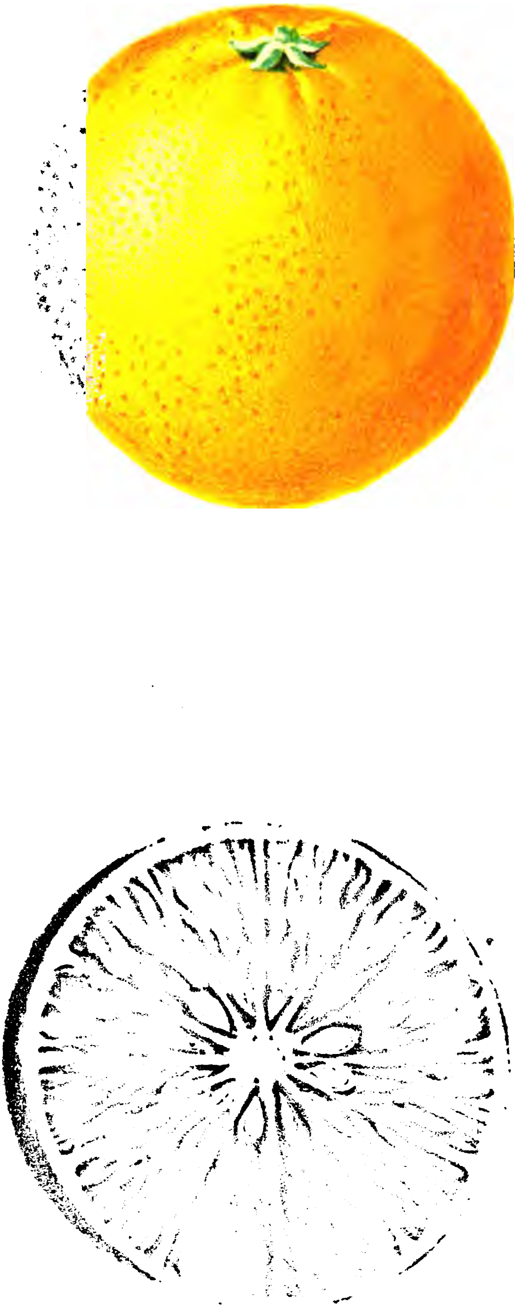
MALTESE BLOOD.



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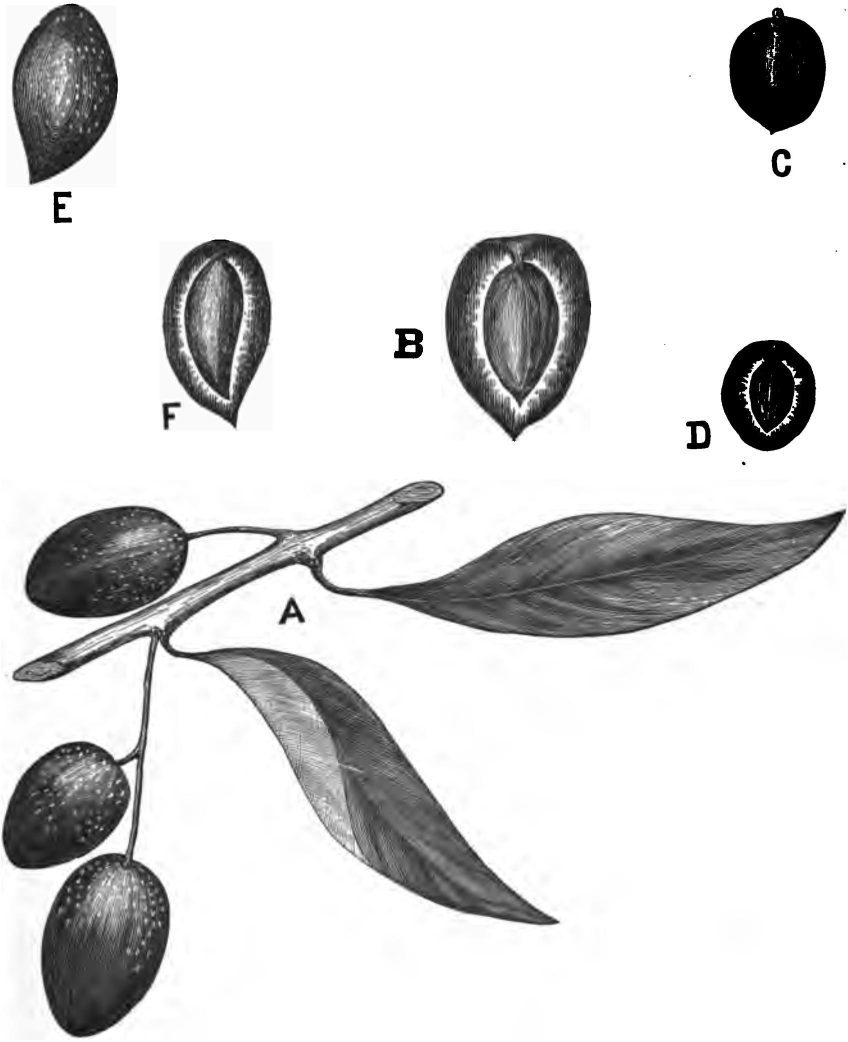
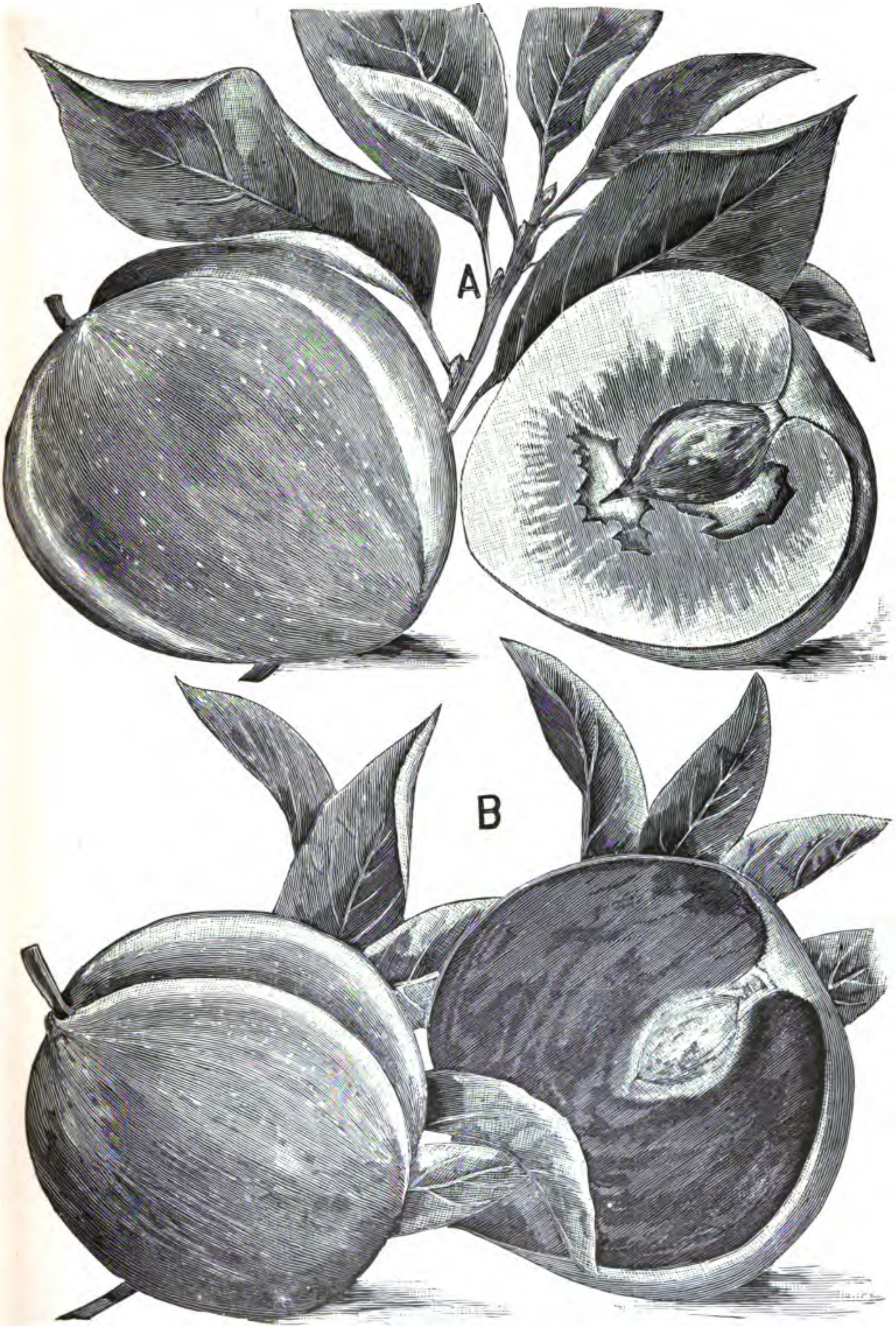
PAPER RIND, S^{T} MICHAEL.



THE OLIVE.



From a Painting of PROF. H. E. VAN DEMAN.

A. KELSEY.
B. SATSUMA.

JAPANESE PLUMS.

SUPPLEMENT TO THE REPORT OF SECRETARY.

The Olive: Varieties, Opinions, Mission vs. Picholine, Pendoulier. Japanese Plums: Satsuma and Kelsey. The Orange: Valencia Late, Maltese Blood, Paper Rind St. Michael, Mediterranean Sweet, Wolfskill's Best, Satsuma, Pomelo, Bidwell's Bar Orange. The Lemon: Curing of, Processes, Sulphuring, Budding, Renewing Old Trees, Budding into Large Limbs. Diseases of the Orange and Lemon: Remedy; Cause of Gum Disease. Cutting the Top of Gum Diseased Trees. Pruning: Advantages of Low Trained Trees; Extending the Roots of Trees in Planting. Plums and Prunes: Nomenclature of Prunes; French Prune Driers. The Apricot in France. How Prunes Should be Handled; Flattening of Prunes; Naming our Prunes. The Apricot: Soil and Climate, Varieties, The Shot Hole Fungus, Propagation and Planting. The Peach: Its Culture and Marketing, What to Plant. Table Grape Culture. Crystallized Fruits: The Method. Fruit Drying.

THE OLIVE.

The culture of the olive has become one of the regular industries of this State, and of the great future which awaits it there is no doubt. Olive oil making cannot be overdone; as the production increases so will the demand, and there cannot be enough produced to supply the demand for many years to come. Many new plantations have been started all over the State, and many more would have been started if the trees or cuttings could have been obtained.

In the interior valleys many large olive orchards have been planted; these trees are young, and many have begun to bear fruit this year. There is no doubt that in a few years there will be an abundance of olive oil produced in this State, as all these plantations are doing exceedingly well, and are planted on soil well adapted to their culture.

VARIETIES.

At present there are but two varieties most largely grown, that is, the Mission and the Picholine. The planting of the Mission is much advocated by many, because the fruit is a large berry and the tree a rapid grower. The latter is also strongly recommended because it is an early olive, ripening much ahead of the Mission, and it is claimed to produce a much richer oil. (See illustrations in Plate No. 4.) That which I have sampled does not substantiate this statement, although this is hardly a fair test, because the quality of the oil greatly depends in the manner in which it is made. It is claimed that the advantage the Mission has over the Picholine is, that while it may not bear such heavy crops, that the fruit being larger, is much easier and cheaply gathered; while on the contrary, those who advocate planting the Picholine say, "That while the tree does not grow so large, that it is a good, regular bearer, and that the fruit is easily and cheaply gathered on cloths." In answer to various letters which I addressed to those growing the Mission and the Picholine, not two letters agreed. The opinions formed were about as follows:

From Sonoma County.

"Both have advantages. The Mission will perhaps grow on a drier and poorer soil than the Picholine olive. This statement, though not fully proven, seems probable from experiments in this and several of the southern countries. The Picholine, however, grows with great vigor on any sandy soil.

"The greatest fault with the Mission in this part of the State is the late and uneven ripening of the fruit. Last fall a large portion of the crop was destroyed by the frost. The early and even ripening of the Picholine alone would be sufficient recommendation, but in addition to this it bears a regular annual crop, which is very easy to gather, as the branches droop with the weight of the fruit, which separates easily, and may be stripped on cloths at a slight expense."

A Grower in the Same District.

"In 1875 he rooted about one hundred trees of the Mission variety. They commenced to bear fruit in 1879. That year he picked a few berries from them. In 1880 he set out rooted trees of the Picholine variety, and the first trees to bear was last year, when about a pint of berries was picked from each tree. Trees of the Mission, planted the same year and time that the Picholine were planted, are three times the size of the Picholine. Both varieties are on the same kind of land, and receive the same kind of treatment."

From Placer County.

"At this place there are two eight-year old trees (a Mission and a Picholine) standing only fifteen feet apart, and having had always the same care. Last season the Mission yielded forty-nine pounds of berries, while the Picholine gave sixty-three pounds. This season the Mission has hardly any fruit, while the Picholine was considerably more loaded than last year. The Picholines in 1887 were gathered on November first; the Missions were gathered just before Christmas, and then they were but three fourths ripe."

From Los Angeles County.

"The Picholine is a regular and abundant bearer, but the fruit is no larger than a cranberry, and very tedious to pick. It is not good for pickles, the stone being too large in proportion. But it is a sweet olive when ripe, and the stone is full of oil, and I doubt not it would be profitable for oil. The Mission fruit is much larger, perhaps four times the weight of the Picholine, and makes splendid pickles."

Letters from other localities contained about the same information as the above; what one advocated the other was sure to disagree on the very point he had been so careful to write. Perhaps it is well to here leave this subject rest until I shall have obtained the experience of the olive growers of another year.

The Mission, however, has done well in this State, and has produced an oil that, in my opinion, cannot be excelled, and which has begun to attract the taste of the eastern consumers.

The consumers of imported adulterated oil are now beginning to rebel against it, and seek for that which is pure and healthy.

The Mission is a rapid grower, and commences to bear young, does well in this State, and can be found growing in almost every district from the extreme northern to the extreme southern part of the State.

New varieties require considerable time to be tested, and when the fact has been clearly demonstrated that better and more productive varieties are fruiting in this State, then it is an easy matter to bud or graft the trees having a thrifty and healthy stock to start with.

PENDOULIER.

Mr. L. P. Rixford, of Sonoma, imported this variety from France some ten years ago. The original label was lost, therefore doubts were entertained of it being the Pendoulier. Professor Gustave Eisen pronounced it the Pendoulier after investigating the tree and fruit at Mr. Rixford's place. I also showed specimens of the fruit to Mon. Adolphe Flamont, who immediately pronounced it to be the Pendoulier, and said that it was a most highly prized olive, both for pickles and for oil. The sample of oil expressed from this olive is the sweetest I have yet tasted; it was also so pronounced by those who have sampled it. The fruit is somewhat smaller than the Mission (see illustration F and E in Plate No. 4). The pit is small and slender, with a curve, and a very sharp point. It ripens even and much ahead of the Mission. The tree is a rapid grower, being equally as large as the Mission of the same age.

JAPANESE PLUMS.

Recently many new varieties of plums have been introduced from Japan. The fruit of most of them resemble our Wild Goose and Cherry plums; most of them have been given new names after having fruited here, for it has been very difficult to distinguish them by the names (Japanese) under which they were imported.

SATSUMA PLUM.

Introduced by Luther Burbank, of Santa Rosa, three years ago from Southern Japan. It is an excellent plum of very fine appearance. The flesh is of a solid, clear purple color from skin to pit. The pit is very small, and clings very tight to the flesh.

The fruit is somewhat larger than the Kelsey, and more globular, richer and better flavored. Ripens from five to six weeks ahead of the Kelsey. The tree is a vigorous grower; has large dark green leaves. This year it ripened from July twentieth to August first.

KELSEY.

This plum continues to bear well, and promises to become a popular variety in our markets. The flesh is quite firm, of a delicate yellow color; a cling-stone. Fruit is of excellent quality, quite highly flavored. Tree an upright and a thrifty grower. The leaves are rather narrow, somewhat like the Wild Goose plum. The tree is quite tender, and will not flourish in a cold climate; therefore it is well adapted to our State, as our warm climate is most favorable to its culture.

THE ORANGE.

The culture of this tree in this State is rapidly increasing, and many new orchards have been started within the past year. So large has been the demand for good trees, that all the nurseries in the past two years became entirely exhausted of all good stock for orchard planting.

There seems to be but three States in the Union best adapted to the growth of citrus fruits, *i. e.*, Louisiana, Florida, and California.

The main crop of Louisiana ripens from November first to February first, that of Florida from December first to March first, and that of California from February first to July first.

The Panama orange crop cuts no figure as a competitor, because the crop is picked green for shipment to undergo the voyage. This fruit is not attractive in the least, as it arrives in an unnatural color, and very poor in quality.

That from the Mediterranean, and that from Mexico, comes into the market when it cannot materially affect the trade.

The competition the California crop meets with is but little, coming in, as it does, when all others are practically out of the market.

Those wishing to embark into the business, and wishing information on the subject, I most respectfully refer them to the report of Chief Pomologist, Prof. H. E. Van Deman, 1887, and to Bulletin No. 1, of the Pomological Division, and also a "Treatise on Citrus Culture in California" by myself, as want of space at the present time prevents a more extended account of this most important industry.

There being considerable inquiry at the present time as to the most profitable varieties, the accompanying plates have been issued in answer thereto.

VALENCIA LATE.

A remarkable variety, which has fruited in this State for five or six years, was originally planted in San Gabriel, where it has done remarkably well.

The tree is a rapid grower, and promises to become suited for standard orchard purposes.

It does not commence to bear young, but until it has attained quite a good size, and able to support the weight of the fruit; as a rule, most of the foreign varieties commence to bear when very young, often a year from the bud, which is a detriment to the health and growth of the tree.

Such trees if allowed to bear, will tend to remain low and bushy, as if apparently stunted. After a tree has been allowed to remain so for several years, it is very difficult to force it to grow upwards, or make a standard tree of it; its tendency will always be to branch out, and to become low and bushy, even when heavy pruning has been resorted to.

The fruit is pale yellow, of the St. Michael type, and very firm (Plate No. 1), oblong shape, size medium to large, with few seeds, medium thorny, with a decidedly high flavor, and very juicy, ripens late—May and June.

Since the issuance of my "Treatise on Citrus Culture," I have received a great many letters asking "of what good would it be to grow an orange that would ripen in June when it would then be out of the orange season; that other fruits are in then which are in their season." To this I can only say: "That although it seems out of season because the orange ripens in June, and really it would be if the orange was an early variety, but ripening in the month of June is in season then, and its flavor is as fine as that of an early orange in season in the month of March; and what more, the markets then demand an orange that is in season at that time, which is when all the early varieties are out of the market."

MALTESE BLOOD.

This is one of the most popular of the many varieties grown in this State. Unfortunately many inferior varieties have been sold under the name of Maltese Blood, and the fault lies, to a great extent, with orchardists buying trees propagated from trees imported under that name, before they had borne any fruit, which afterwards proved to be of inferior quality. Of the many varieties grown under similar names, but few resemble the true type, and those that do are without any coloring whatever; others show a slight trace of coloring, but the habit of the tree is entirely different, as also the fruit.

The true Maltese Blood (Plate No. 2) is oval in shape, of medium size, with a decidedly fine texture and flavor; the pulp is marked and seems to be streaked and mottled with blood, is nearly seedless, and the tree is thornless.

The tree is of a dwarf habit, and can be set close together in orchard form; many growers bud this variety into the limbs of large trees, that is, trees that have been planted four or five years in orchard form, and in this way a large tree is produced of a dwarf variety, and the quantity of fruit enhanced.

PAPER RIND ST. MICHAEL.

This is a remarkable and popular variety. The tree is of a dwarf habit, medium thorny, and a prolific bearer; the fruit keeps well on the tree, and does not drop when mature, as other varieties do; it also retains its flavor until quite late in the season.

The fruit is medium small, round, and very firm and juicy. (Plate No. 3.)

Color, pale yellow; with a very thin rind. It grows very uniform in size, which is a great advantage in packing, as they do not require any assorting. This variety can be made more productive by being budded on large stock. All dwarf varieties do better when so worked, because it is difficult to make standard trees of dwarf varieties, when they have to grow and make their own stock; but by budding them into large trees this difficulty is avoided.

MEDITERRANEAN SWEET.

(Figure No. 1.)

Fruit medium to large; pulp and skin of fine texture; very solid and few seeds; ripens late, often not until May or June. The tree is thornless, and of a dwarf habit of growth; inclined to overbear. This variety is now well known, and much sought for in our markets. It was originally introduced by T. A. Garey, of Los Angeles.

WOLFSKILL'S BEST, OR FAVORITE.

(Figure No. 2.)

Originated by J. W. Wolfskill, of Los Angeles. A good grower. Original tree stands over thirty feet high, and as large as any seedling of the same age. The original tree is not very thorny. Thorns decrease in size as the tree grows older. Fruit is of excellent quality, somewhat flattened, deep orange red, fine grain and pulp. A good bearer; fruit ripens early, and should be picked before May. Ripens ahead of all other native varieties; is largely cultivated in this State, and is the choicest of all native varieties.

The advantage a good variety (of home origin) has over any foreign

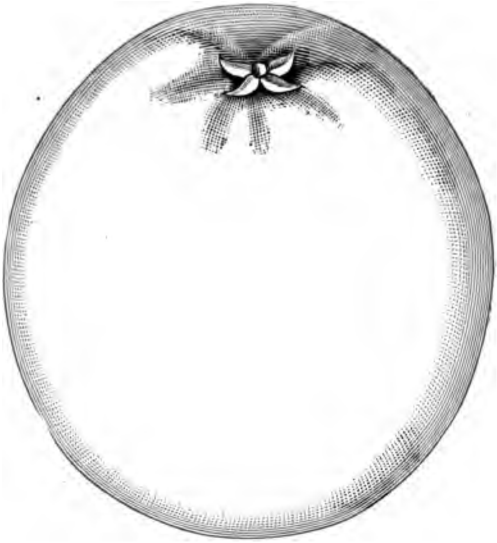


Figure No. 1.

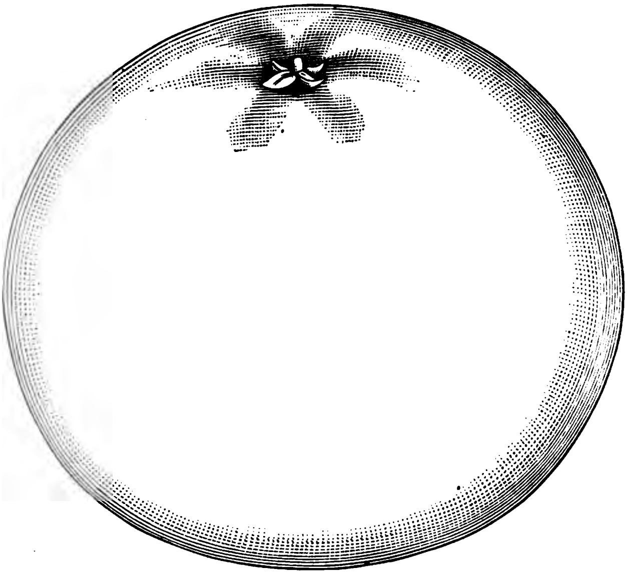


Figure No. 2.

variety is that it is hardy, and can be planted in localities where the temperature gets so low as to prevent foreign varieties from thriving; they will also make a larger tree.

SATSUMA.

Recently many large lots, numbering into many thousand trees of this variety, have been imported into this State from Japan, budded and grafted on the dwarf stock (*Citrus trifoliata*), and pretty much distributed all over the State where the orange is grown. So well was this orange advertised that the dealers sold all they were able to introduce, and so determined were the people to obtain them that no notice was taken of the dangers of diseases and insect pests, of which due notice was given by the State Inspector of Fruit Pests that he has not found a single lot that had arrived free of infection. Under the present laws they only could be disinfected, but it being an impossibility for any remedy to reach every insect, or every germ of disease, it would be well for some to look in that direction, and possibly they may regret the mistake they made, although the lots I saw looked remarkably well after being removed from the steamer.

This orange has been imported under the name of Unshiu, or Oonshiu, but has been known in Florida and in this State under the name of Satsuma for several years previous to these importations; it has been grown in the San Gabriel Valley for more than five years, and has yet its reputation to make. The specimens I have tasted, direct from Japan, are much finer than those grown in this State, the former being of very fine grain, while the latter is somewhat coarser.

Climatic conditions may account for this, which has proved so with most imported varieties. In answer to many letters, bearing on this variety, I have recommended, and still adhere to it, *i. e.*, budding this variety into sweet seedling California grown stock, as it is better and a more rapid grower than the stock they come budded on, and in this way no risk is taken in not getting the true variety, and the tree most certainly will become larger and more productive. Those that have planted them in orchard form, as they came from Japan, budded on the dwarf Japanese stock, I doubt will ever stand under their shade.

The fruit is of medium size and flattened; of exceedingly fine texture, quite juicy, and nearly seedless; is quite sweet, but lacking the real orange flavor, having a peculiar flavor of its own; it grows very irregular, all sizes being found on the tree. One thing that makes this tree remarkable is its hardiness, having stood unharmed where other varieties were badly damaged by the frosts.

The rinds of most Japanese and Chinese varieties have a peculiar and very unpleasant smell, and on this account they do not come into favor in the market; this variety, however, seems to be free from that peculiarity. In San Gabriel it ripens in November and December.

POMELO.

(Syn. Grape Fruit.)

Bearing on this variety, Professor Van Deman, Chief Pomologist, in his recent (1887) report, says:

> Although closely related to the Shaddock, this is a fruit of excellent quality; it ripens mainly after the orange is gone, and is then highly esteemed. Florida produces the best in quality, and almost the entire amount grown. In the northern markets it is becoming popular and will be a very profitable crop to grow.
>
> The flavor is quite peculiar. It is somewhat bitter, but withal, very agreeable, especially after the second or third trial. There is to my mind no more wholesome and refreshing fruit for dessert used during the spring and summer. It should be eaten by cutting the fruit in halves, crosswise, and using a spoon to avoid the bitter taste of the rind. Most varieties are of large size, often five inches or more in diameter, and nearly round, being uniformly a light yellow.
>
> The name "Grape Fruit" was given to it from the fact that the fruits hang so closely along the branches as to crowd each other, and in the distance look like huge clusters of yellow grapes, but the name is otherwise so inappropriate that I have decided to use *Pomelo* instead, which name, however, is less used than the former.

In this State, the fruit has never come into favor, and the tree has only been grown for ornament. In San Gabriel, many trees of various varieties may be seen through the summer with half of their load on the ground, as few care for them except for curiosity, and those that have been sent to market find no sale, and wilt and turn dark on the fruit stands. However, it possibly may be that the varieties grown in Florida are superior to those grown in this State, and it would be wise to experiment in that direction; but most of those grown here have a peculiar odor, and for this reason people care but little for them.

THE BIDWELL'S BAR ORANGE.

Much has been written concerning this tree, but its true history has never been made public until now. I am greatly under obligations to Hon. E. W. Maslin for having aided me in procuring the same, which I append hereto with pleasure:

Letter of E. W. Maslin.

SACRAMENTO, August 4, 1888.

Mr. B. M. LELONG:

DEAR SIR: I wrote and got the inclosed letter and photograph from Mr. I. R. Ketchum, the owner of the tree, or rather the manager of the toll-road.

It seems that Mr. Morrill, of Sacramento, planted the seed in 1855; grew the tree, and sold it to Mr. Van Norden in 1859. Van Norden sold out in the road, but Ketchum has had it in charge since that time.

The importance of the tree is that it is the source whence were obtained many thousand buds, and of course thousands of trees in Northern California trace to the Bidwell's Bar orange.

Bidwell's Bar is on the Middle Fork of the Feather River, nine miles from Oroville.

Yours truly,

E. W. MASLIN.

Letter of Morrill to Ketchum.

SACRAMENTO, May 18, 1866.

I. R. KETCHUM, *Esq.:*

DEAR SIR: I raised and sold, some eight years ago, some orange trees from seed taken from an orange that came from Acapulco, Mexico. I sold two trees to Mr. Van Norden. We then talked about the fruit, and agreed to change buds or fruit. Mine has produced fruit, but no insides to them; all skin.

Mr. Van Norden showed me some of yours which were fine. Will you let me have a few buds?

I am yours, etc.,

J. MORRILL.

Letter of Ketchum to Maslin.

BIDWELL'S BAR, July 31, 1888.

Mr. E. W. MASLIN, *Sacramento:*

DEAR SIR: The Bidwell Bar orange tree was raised from the seed of an orange that came from Acapulco, Mexico, by John Morrill, at Sacramento, California, in 1855. (Mr. Morrill's letter to myself in 1866 is inclosed.)

The tree is fifty inches in circumference six inches above the ground, is twenty-six feet six inches in height, and twenty-four feet through the branches.

Mr. R. T. Van Norden, now real estate agent at 413 Montgomery Street, San Francisco, purchased the tree of Mr. Morrill in March, 1859, and it came here from Sacramento in a ten-inch tub, was five feet high, and had five branches.

The tree has been in my care since it was brought here in 1859. It was first set out under a wall by Mr. Howard Burt, in the south side of the office, but was afterwards removed to its present location. Had it been left in the first location, the freshet of January, 1862, would have carried it off, as it did a number of other fruit trees.

It bore oranges for the first time in 1865; had forty oranges. In 1866 it bore five hundred. In 1882 the crop numbered two thousand two hundred, about seven hundred more than any one year before or since. The regular crop is about eight hundred.

It is evidently of the Los Angeles variety.

Some years many of the oranges are very large. Seven years ago two oranges weighed, together, two pounds fourteen ounces. Generally round, some few oblate; skin of all the larger oranges is thick; of the smaller, thin.

It takes twelve months to fully mature its fruit. The first of December the fruit is a sulphur color. The first of January, an orange color. After fully coloring the fruit increases in size from one fourth to one third.

I send you a photograph of the tree and bridge, as you have taken an interest in it. Mr. Lelong can get from Mr. Van Norden his account of the origin.

Yours respectfully,

I. R. KETCHUM.

THE LEMON.

VARIETIES TO PLANT.

A marketable lemon should not be large, but of medium size, sweet rind, and strong acid.

The common seedling lemon does not pay to grow; its keeping qualities are very poor; if put to curing, as soon as it leaves the process the majority will be found to be worthless, almost every lemon will show signs of decay. Therefore it cannot be expected that lemons of inferior quality will pay their culture.

LISBON.

Imported from Portugal. Fruit is of medium size, fine grain, sweet rind, and very strong acid; very few seeds. The fruit grows very uniform on the tree, a good keeper, and a prolific bearer. Lemons can be picked from the tree at any time of the year.

The tree is a strong grower, and makes a larger tree than the other varieties described under this head. Is quite thorny, but thorns decrease in size as the tree grows older. A very desirable variety.

VILLA FRANCA.

Imported from Europe. Is of a medium size, considered to be the finest of all lemons grown. This lemon has fruited in Los Angeles for several years in the orchard of J. W. Wolfskill. Fruit oblong, slightly pointed at the blossom end, rind thin, without any trace of bitterness even when green, acid strong, juicy, nearly seedless. Tree thornless, branches spreading and somewhat drooping, foliage sufficiently abundant to prevent the fruit from scorching. This variety has the name of withstanding a lower temperature than other imported varieties.

GENOA.

Imported from Genoa by Don José Rubio, of Los Angeles. Medium size, oval, sweet rind, thornless, and nearly seedless. Tree is of a dwarf habit, a good keeper, one of the best.

ASIATIC.

Imported by J. W. Wolfskill, of Los Angeles. Fruit medium size, oval, thin rind, without any trace of bitterness under the most careful tests. Tree and fruit resemble the Genoa, but a better acid; thornless.

SICILY.

This lemon was about the first cultivated in California. Since then many other varieties have been introduced which are far its superior. However, if put through the proper treatment will produce a good lemon.

EUREKA.

A native of California, originated by C. R. Workman at Los Angeles, from seed imported from Hamburg in 1872, only one seed growing, from which buds were put by him on orange stock. Introduced to the public by T. A. Garey, of Los Angeles. Fruit medium size, sweet rind, a very good keeper, and very popular, more so than any other variety. The drawback it has is that the leaves are inclined to curl, scarce foliage, fruit produced at extremities of branches and liable to get sunburnt; but this is generally avoided by leaving the branches hang low, and pruned as little as possible.

AGNES.

Originated at National City by Mr. Frank A. Kimball. This lemon is of superior quality, medium size, sweet rind, pulp very fine, with strong acid and very few seeds; thorns few, short and blunt; is a rapid grower, but drooping in character; medium dwarf. This lemon has fruited for six years with Mr. Kimball, and has proved itself to be a good keeper and a very desirable variety.

OLIVIA.

Originated by George C. Swan at San Diego. Fruit of medium size, and said to be of excellent quality; strong acid, and a good bearer; thorny.

GARCELON'S KNOBBY.

Originated by G. W. Garcelon at Riverside. The fruit is of medium size; when cured very thin rind, juicy, and the tests have found it to contain more citric acid to its size than other lemons.

CURING THE LEMON.

Clip (stem cut; do not pull) the lemons when nearly fully grown and when beginning to show a faint sign of golden color. If cut too soon, it will injure the flavor and reduce the amount of juice, which is the certain effect if picked before they begin to color; and if they are allowed to remain too long on the tree the rind will become puffy and will not cure so well, or make as good a lemon.

LAYING THEM ON THE GROUND.

As soon as clipped, lay them on the ground under the tree where not a ray of sunshine can fall upon them, as that would make them spotted. It is not necessary to put any covering on them, unless the trees are pruned high. That would allow the sun to strike direct on them. In such a case it is well to place some loose straw over them. Let them lay on the ground a week or ten days, the weather permitting.. They should not be handled until they have shriveled enough to allow handling. Then take them in a close room and pile the boxes or baskets and cover them with gunny sacks or blankets; shut the door, and let them remain at least forty-eight hours; then wipe the lemons carefully, for they will be covered with moisture, and put them into boxes, filling them only half full, and be careful not to let a current of air pass through the room. The doors should be shut and the ventilators opened until the lemons are perfectly dry, which will be in three or four days. Then carefully size them, and leave out all imperfect ones, as it injures the sale of the good fruit. Then wrap them in tissue paper and pack them very tightly in boxes, marking the number of lemons and brand on each box. In picking it is best to use baskets or sacks, and the fruit will not get pricked with the thorns.

OTHER PROCESSES RECOMMENDED.

Mr. A. Scott Chapman, of San Gabriel, has met with very good success in curing lemons. His process is very simple: The fruit is gathered green, just when turning to yellow, and of such a size that, allowing for shrinkage, will pack from two hundred and fifty to three hundred and fifty in a box. The man gathering has his sack suspended across his shoulders, takes hold of the lemon with his left hand, and with his right clips the stem with a clipper close to the calyx of the fruit.

In case he should drop one he is not allowed to pick it up, for that lemon is liable to rot. He carefully places them in his sack, and having half filled the same, places them one by one in a tray. The trays are placed one above another in the shade of the tree (the trays are six inches deep, filled four inches deep with lemons); there they are allowed to remain for one week, the weather permitting. They will then bear the jar of transporting them to the packing house. At the packing house the trays are placed one above another, about six trays high; a layer of old newspapers is placed on the topmost trays, to keep the lemons therein from drying too fast and getting dusty. At the end of another week, if the weather has not been damp, they will be ready for packing, being yielding and leathery to the touch; they will also have turned yellow. Then they are assorted into sizes and packed. Only those of the same size are packed in the boxes by themselves.

Recommended by Dr. O. H. Congar, of Pasadena.

I have had some experience in regard to handling the oranges and lemons, as to their condition of ripeness, and their effect when picked under certain conditions. I speak of the lemon, because I have paid more attention to that than to the orange. It is a well known fact that the lemon in this State requires certain treatment in order to produce a fruit of first quality. I may say, first and foremost, soil has something to do with it, and something in the matter of treating the trees, as to the amount of water the tree is to get, etc. I would speak of the lemon as it is taken from the tree, and as far as I go I speak of the Eureka, Lisbon, Sicily Bud, and the Genoa. Those lemons, under the treatment I have pursued, will produce a lemon that I challenge the world to surpass.

The lemon wants to be slightly colored on the tree before it is picked; it wants to receive from the soil all the properties that will make it perfect. It must be picked at that stage with the best of care, without much handling. I mulch my trees with straw, and lay the lemons immediately under the tree; it matters not whether it is damp or dry. Of course, if it is a dry portion of the year, I leave them there a less time than during a damp season. They will remain under the tree for weeks, if it is a moist atmosphere. I don't place them over two or three inches deep, and they will cure down to a lemon which I will challenge the world to surpass. By this process the skin loses moisture, and becomes soft almost as a glove, but it is hermetically sealed. There is no chance for the oxygen of the air to penetrate that rind, and it is the oxygen of the air, as we all know, that causes the decay of all fruits. If you will keep out the oxygen from the fruit, it will never decay. Hence the necessity for picking our fruit with a great deal of care. If lemons are handled as I have described, you need have no fear of foreign competition.

Recommended by A. B. Kingsley, of Ontario.

Mr. Kingsley gives the following as his method of curing lemons: Pick the lemons when they are beginning to turn, and of a good size; place them in a raisin tray with sides on until you have it full, just touching each other; then placing another tray over it, bottom side up, not letting the top tray touch the lemons, and so on until you get your lemons all packed, putting one set of trays upon another. This method, if they are kept in a dark place or covered with sacks, will take about three or four weeks to cure. I also tried another method of packing in dry sand, in raisin sweat-boxes, not allowing them to touch each other, and keeping them in a cool, dry place. After keeping them six months, the method proved very successful. As to the variety of lemons, I have the Eureka and the Lisbon, which are both good. I think lemon culture fully as profitable, if not better, than orange.

SULPHURING THE LEMON.

Bleaching the lemon with sulphur fumes was extensively experimented with. It had been claimed that fruit treated in this way would keep an indefinite time, as the sulphurous gas would toughen the skin and dry up the watery particles, and that it would kill the fungoids on the fruit. Lemons treated in this way did not prove thus. As soon as they left the treating rooms they were noticed to be spotted, and by the excessive use of sulphur some would be rendered white, while others would still retain part of their color on one side, while the other would be bleached to an unnatural color. This has been abandoned.

CURING COMMON SEEDLINGS.

Three years ago a grower at San Gabriel, having an orchard of one hundred and fifty large seedling trees, experimented for the purpose of testing their keeping qualities. He went about it in a practical way: The fruit was stem cut with great care, and laid carefully on straw under the trees away from the direct rays of the sun. When they had shriveled enough to allow handling, they were wiped dry and put into boxes, filling them one half full, and put into the packing house. About three weeks after they were repacked, and all decayed lemons found therein (about 50 per cent) thrown away; nothing but apparently sound fruit was packed, and each one carefully wrapped in tissue paper. Out of about one hundred boxes picked only fifty-two were shipped. They were shipped to San Francisco, being on the way four days. Upon arrival it was noticed that many were decaying. In order to be sold they had to compete with well-cured lemons, as the market was well supplied at the time. They had to remain in the warehouse, as buyers would not take them at any price. Only a few boxes were sold. The grower, after waiting patiently for his returns, was surprised on receiving a letter from the dealer, in which he was informed that he was indebted in the sum of 75 cents balance for freight on the lot.

BUDDING THE TREES.

After going through this sad experience, the grower asked my advice in the matter. I recommend that they should be budded into a good marketable variety. The question was then (the trees are very large—buds will not take in the old wood), how will you do it?

HOW IT WAS DONE.

In the early spring, as soon as the trees show signs of growing, I cut the main branches (some as thick as six inches through) within two or three feet to the crotch of the tree—all lower, also several other branches, were allowed to grow. For if all the foliage of the tree is removed, the shock is so great that the tree seldom recovers its vigor. The trunk will sunburn, and in many instances the trees have been lost. Very soon after numerous shoots began to put forth at the end of every limb that was cut; and when about four to six inches, only those intended to remain were left. All others were removed. When these shoots had attained a large enough size, the large branches which had been left were all removed, and the sap forced into the young shoots. The fine branches around the trunk, however, were allowed to remain, to prevent the hot sun through the summer from scorching the bark. The new shoots were then very strong and thrifty, many being two inches in diameter. In the fall they were budded with the Eureka lemon, and the buds allowed to remain dormant through the winter. In the following spring all this brush was removed, and all cuts made were covered with two coats of rubber paint. The dormant buds came out beautifully. Very few of the tops of the shoots were required to be removed to start the buds. One half of the top of the shoot was only removed in order to force them. As soon as the bud was able to support itself the whole top of the shoots was removed to within about eight inches above the bud, and the buds that had started were tied to what had remained of the shoot. The body of the tree was kept clear of all suckers or sprouts. At first the suckering was considerable, as in the warm weather, and after each irrigation, and as the buds were not able to take up the entire sap flowing up a large trunk, it caused the sprouts to come out all over the tree; but when the buds were large enough to shade the trunk this ceased. Those buds are now nearly three years old; are very large. Many lemons are now on them, and the old worthless seedlings are no more, but in their stead a beautiful and thrifty Eureka lemon orchard.

BUDDING INTO LARGE LIMBS OF ORANGE TREES—A NEW METHOD.

Meeting with such difficulty in making buds grow on old wood, led me to carry on a series of experiments, to find, if possible, a way by which buds would grow in old and large limbs; that if this was accomplished, it would do away with having to cut the tops and wait for the new wood to grow, in order to bud into it.

The Method.

The very largest buds were selected, those having a large thorn (Figure No. 3). The bud was cut, leaving into it considerable wood, and at least one inch long, taking from the limb it was cut at least one half of the wood; then with the sharp point of the knife the wood in the bud was gouged out.

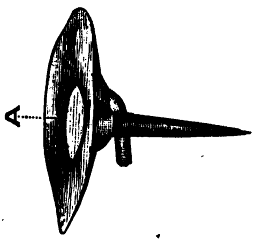


Figure No. 3.

Great care was used not to run the end of the knife into the bark of the bud on either side, the wood being carefully removed, leaving but a very small portion of it, only enough to hold the thorn firmly to the bark of the bud, as shown in Figure No. 3, A. It was then inserted into the tree, and then wound tightly with twine. The end of the thorn should not be cut, as it causes the bud to wilt and die. The result of this experiment was very satisfactory and successful. This was done in spring, summer, and fall; the buds being large and plump, made good growth and not two per cent were lost. This budding is best to be done in the spring, as there is at this time an abundance of sap. The buds will also take better than when inserted later. About an inch of the bark above the bud in a circle can be removed to force the sap into the bud, which will start before the top is cut away. The top is left on the tree to protect it. The twine should be left on the trees as long as possible, because the bark is thicker on a large tree than on a small one; and if the twine is removed too soon the bark will open, caused by the action of the atmosphere, and the bud will be left exposed and will dry. However, great care should be taken not to leave it on too long, as it will cut into the tree. If upon examination it is found that it is working into the bark, it should be loosened, untied, and tied (with the same twine) over again. If this work is done in the summer or fall, the buds must be left to lie dormant through the winter. In early spring the top of the tree is removed, and the bud allowed to grow; but in no case should the entire top be removed. At least one large limb should be left to force the sap into the buds, and all the lower brush on the trunk should be left to protect it from being sunburned. This is, however, removed as soon as the buds are able to shade the trunk and take from it the sap flowing. When these large limbs are removed, the cuts should immediately be painted with at least two coats of the best rubber paint, to protect them from cracking, and so that they may heal and become healthy.

DISEASES OF THE ORANGE AND THE LEMON IN CALIFORNIA—GUM DISEASE.

This disease is first detected close to the ground, and also upon the trunk of the tree, and also on the limbs. It is a yellow gum which forms on the outside of the bark. It is an exudation of the sap of the tree which breaks through the bark and forms a gum. For several years various remedies were tried, but none proved effectual, for how could they; for the disease was not on the outside of the bark, as many did suppose, because they saw the gum running down the trunk. The disease is under the bark, and also will be found to have entered the inner bark, and in bad cases deep into the wood.

Remedy.

Cut away the bark surrounding the place from where the gum is oozing. When this is done, it can be detected where the main affected parts are. Then cut into the wood with a half-moon chisel or gouge, until all the parts from where the gum is oozing are removed; then leave it stand for a couple of days; then, if on examination it is found that the gum is still running, cut away more of the wood, until every particle of the disease is taken out. (Generally, if any is left, yellow streaks are seen in the grain of the wood, which are traces of it.) Then leave it alone for one or two days. If, on examination the second day, no more gum is seen, or any trace of it whatever, then it is a sign that all of it has been taken out. The wound must then be covered with some substance, so as to not allow the action of the atmosphere from cracking the wood left exposed, as it may injure the tree. If the disease has gone clean around the tree, then it is too far gone, and there is no cure for it. In such cases it is better to remove the tree and place a healthy one in its place.

Covering the Wound.

The simplest of all substances is rubber paint, manufactured by the Pacific Rubber Paint Company, at San Francisco. At least two coats should be given it. This will prevent the wound from cracking, and help it to heal.

Diseased Chips and Scrapings.

They must be put [illegible] can as soon as taken from the tree and burned.
the water will take
, and as the germ of
althy trees, and the

only caused by too
r time. While this
xcessive irrigation,
ltivating, or by the
m the bark, caused
by the hames of the harness of the horse rubbing in cultivating; also where trees had been shot by hunters, and by being hit with rocks by boys while trying to knock oranges off the trees. Therefore it must be seen how much a tree needs to be protected by the cultivator as well as from intruders into the orchard, for often the gum oozes from having a limb broken by persons who, in picking an orange, care little for the tree as long as they get the orange upon it. Other diseases such as Die Back, Rust, Root, Rot, etc., are not known in California.

ERRATA.

Through a typographical error, the above cut (Fig. No. 3) appears upside down. The stem of the leaf should be upwards.

Cutting the Tops of Gum-Diseased Trees.

Many have been led to believe that when badly diseased trees begin to show signs of decay, that they can be restored to perfect health by simply removing all the limbs, to force them to make new growth. The trees, of course, put forth, and the new shoots will bear fruit while life still remains in the tree, for generally there are a few healthy roots that keep the trees alive. But such trees will never be of any value, and what fruit they will bear will be very coarse, and much inferior to that once borne by them. They generally remain green for a long time, but such trees cannot come to life again.

PRUNING.

When trees have been allowed to grow at will for several years before they are pruned, most of the inside brush will be found to be dead, and to remove it requires considerable work and skill, for if in removing a branch a hole is made that will allow the hot sun to enter, it will scorch the bark; the fine brush will also die, and diseased trees are sure to be the result. I have often read articles wherein the writers advocate "that the trees be opened so as to allow plenty of air and sun heat to enter." This advice comes from men having no practical knowledge; men who are ever willing to tell, but who cannot do it themselves. I am sure that no one having an orchard depending upon that alone for a livelihood, would ever follow or give such advice. It is not practical, and should be disregarded.

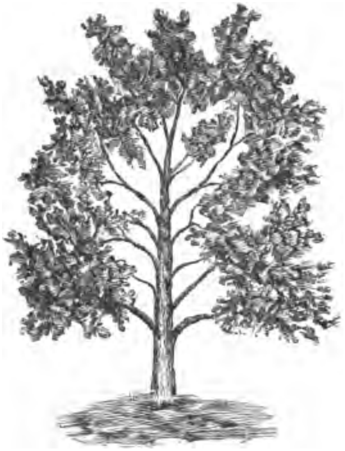


Figure No. 4.

Figure No. 4 is a good illustration of how a tree is left, or what remains of it, after the brush that protects the trunk and branches is removed. The trunk and inside growth is left exposed to the sun's heat.

I have often seen trees where the bark had been scorched and had dried on the south side of the tree, being the result of removing the brush that protected it.

ADVANTAGE OF LOW TRAINED TREES.

There are several points that should be taken into consideration, *i. e.*: In summer the trees must be irrigated. If trained high the sun heat will bake the ground under the trees before it can be worked; as the cultivator cannot run close to the trunk, it must therefore be worked by hand. When trees are trained low, the shade of the branches keeps the ground moist, and in case of the excessive heat, or scarcity of water through the summer, the trees will not suffer; whereas the heat causes the leaves of high trained trees to curl, and if not watered at the proper time, the growth of the fruit is checked. Low trained trees become better balanced, vigorous, healthy, and more productive than when trained high, also become straighter, and the fruit is much more easily and cheaply gathered.

EXTENDING THE ROOTS OF TREES WHEN PLANTING.

It is a common practice among growers to place the tree in the hole, fill it up with soil, and then tramp it. As the roots are covered with thick mud they will stick together, and if the tree grows it will not do as well as when the roots are extended with care. This is very simple. The hole is half filled with earth, so as to form a mound in the hole, the shovel handle is driven down in the center of the mound, and on being with-

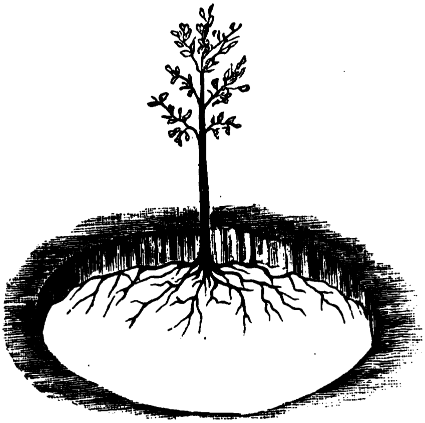


Figure No. 5.

drawn a deep hole is left, sufficiently large and deep enough to admit the taproot of the tree, then the roots are spread over the mound (Figure No. 5), the soil is lightly pressed; heavy tramping is not necessary, as the water settles the dirt and keeps the roots in place. Soon after the trees have been watered, and as soon as the water in the basin has disappeared, the basin is covered with loose soil; this will protect the tree from getting dry and also from leaning over. Trees planted with these precautions make the best growth and become the thriftiest.

PREMIUM PAPER ON CRYSTALLIZED FRUITS.

At the meeting of the Board on July 2, 1888, the following paper was read on "Crystallized Fruits" by J. J. Pratt, of Yuba City, who was awarded the premium of $20, offered for the same:

The process of preserving fruits in a crystallized or glaced form is attracting considerable attention at the present time. This process, although comparatively new in California, has been extensively operated in southwestern France for years, the United States having been heavy importers, paying fancy prices for product.

The process is quite simple. The theory is to extract the juice from the fruit, and replace it with sugar syrup, which, upon hardening, preserves the fruit from decay, and at the same time retains the natural shape of the fruit. All kinds of fruit are capable of being preserved under this process. Though the method is very simple, there is a certain skill required that is acquired only by practice. The several successive steps in the process are about as follows:

First, the same care in selecting and grading the fruit should be taken as for canning; that is, the fruit should be all of one size, and as near the same ripeness as possible. The exact degree of ripeness is of great importance, which is at that stage when fruit is best for canning. Peaches, pears, etc., are pared and cut in halves, as for canning; plums, cherries, etc., are pitted. The fruit having thus been carefully prepared, is put in a basket, or a bucket with a perforated bottom, and immersed in boiling water. The object of this is to dilute and extract the juice of the fruit. The length of time the fruit is immersed is the most important part of the process. If left too long, it is overcooked and becomes soft; if not immersed long enough, the juice is not sufficiently extracted, which prevents a perfect absorption of the sugar.

After the fruit has been thus scalded and allowed to cool, it can again be assorted as to softness. The next step is the syrup, which is made of white sugar and water. The softer the fruit the heavier the syrup required. Ordinarily about 70°, Balling's saccharometer, is about the proper weight for the syrup.

The fruit is then placed in earthen pans, and covered with the syrup, where it is left to remain about a week. The sugar enters the fruit and displaces what juice remained after the scalding process.

The fruit now requires careful watching, as fermentation will soon take place, and when this has reached a certain stage the fruit and syrup is heated to a boiling degree, which checks the fermentation. This heating process should be repeated as often as necessary for about six weeks.

The fruit is then taken out of the syrup, and washed in clean water, and is then ready to be either glaced or crystallized, as the operator may wish. If glaced, the fruit is dipped in thick, sugar syrup, and left to harden quickly in open air. If it is to be crystallized, dip in the same kind of syrup, but is made to cool and harden slowly, thus causing the sugar which covers the fruit to crystallize. The fruit is now ready for boxing and shipping. Fruit thus prepared will keep in any climate and stand transportation.

DECIDUOUS FRUITS.

I append hereto the following "extracts from the proceedings of the State Horticultural Society," of the various meetings held in this office during the past year, which I deem of great importance:

PLUMS AND PRUNES.

Essay by Leonard Coates, Napa

"THE NOMENCLATURE OF PRUNES."

The question of prune nomenclature remains at present unsettled. Pomological works describe some twenty-five distinct varieties. The term "prune," in the English language, signifies those varieties of plums that, when dried, are sweet. "Prune" is merely the French way of spelling "plum."

Here lies the source from which errors have sprung, many varieties of *plums* having been imported to California from Europe, and brought here by foreigners under the French name "prune," while in reality they may not have had the slightest right to the name "prune," viz., a sweet dried fruit, as we understand it here.

For example, take what is commonly called Hungarian prune, and by shippers Gros prune, thereby creating a very erroneous and harmful impression upon the eastern public as to the individuality of a California *prune* in a fresh state, for this Hungarian, so called, is nothing but a large, very showy plum, the other being extremely acid, and, as a dried fruit in any shape, neither profitable nor desirable. The correct name of this fruit, as Mr. Rock has pointed out, is undoubtedly Pond's Seedling.

The prune generally cultivated here as French prune, *Petite d'Agen*—Petty prune—I believe to be synonymous with what Downing describes under the name of *Prune d'Agen*, having also seven French synonyms. There is one other variety, described by Downing, called Burgundy prune, which so nearly resembles it that it is doubtless either a seedling or was grown under different conditions, which caused some modifications in its appearance.

I do not see any reasons for disputing the statements made years ago by Mr. West, of Stockton, after his visit to the prune-growing districts in France. First, that the prune known here as *Petite d'Agen*, is the prune of Agen, the term *Petite* having been locally applied to it in California, owing to its small size in comparison with other fruits; and second, that from time to time seedlings have been originated by the peasants, from which have arisen varieties, or sub-varieties, differing slightly from their parent, and yet being so nearly similar that all have been propagated under the generic name of *Prune d'Agen.*

I wish also to reiterate what I have said on a former occasion, that the French prune is liable to very noticeable outward changes, subject to stock, soil, and the season. I have grafted the same season large trees of apricot, German prune, and almond, with scions of French prune from the same stock, and, in two years, when all were bearing some fruit, the prunes differed very much in size and color. Some were as large as a small Pond's Seedling (Hungarian?), showing that by heavy pruning and thinning the French prune will be as large as those that are graded by the French as their largest select fruit, but which are so large that many have thought, and so stated, that they must have been of another variety.

Mr. Gillet, of Nevada City, is still experimenting with varieties of prunes he is obtaining from France, as I learn from a letter recently received from him.

The expressions Mr. Gillet so often uses are apt to be misleading—"true from the root," "true type," etc.—for there is no doubt whatever in my mind that it is some of the seedlings before alluded to that Mr. Gillet is endeavoring to find.

It is a very common practice among fruitmen in France and Germany to propagate their prune trees by suckers or sprouts from the root. As those produce the same fruit as the tree from which they are taken, of course this tree has never been budded or grafted; or, in other words, is a seedling.

A German in Napa Valley has brought over many of these "sprouts," which bear the same fruit as the trees from which they were taken.

I have found trees in Sonoma and Napa Counties of the French prune, that every year bear larger fruit than the adjoining trees, although stock, soil, age, and other conditions were the same. The inference is, that there are in California prune trees which have been propagated from several of these seedling French stocks, but which are hardly distinct enough to constitute a new variety. Yet, if such be the case, they *should* be distinctly named by the State Horticultural Society, and propagated from as rapidly as possible.

I have samples of another prune which I imported from France under the name *Prunier Datte*, and which is identical with the variety called by Mr. Rock, *Robe de Sergent.* I have both trees growing and fruiting together.

By reference to Downing, it will be seen that *Robe de Sergent* is given as a synonym of *Prune d'Agen*, and further, the significance of the term *Robe de Sergent*, referring to the varied colors in a recruiting Sergeant's uniform, is lost entirely if applied to this fruit, which, as will be seen by the sample, is nearly round, and of a dark purplish color, never assuming those varied colors so often seen in the *Prune d'Agen*, or French prune.

I am, therefore, entirely at a loss as to the correct nomenclature of this variety. The wood and habit of growth are very similar to those of the French prune, but the fruit is very distinct.

The prune described by Chas. Downing as *Imperiale de Milan* seems to be identical; it is as follows: "Tree vigorous, rather spreading, branches smooth. Fruit rather large, roundish oval. Suture broad, extending two thirds around one side, often enlarged. Skin deep purple, covered with a thick blue bloom. Stalk stout, set in a small cavity. Flesh greenish, juicy, sugary, adheres to the stone. Good. Early September."

At the next meeting I hope to be able to show that there is a marked difference between the Silver prune and Coe's Golden Drop.

THE TYPES OF THE FRENCH PRUNE.

Mr. Coates' Second Essay.

Mr. President and Gentlemen: The expression, "Types of the French prune," or of any other fruit, is objectionable because it is misleading.

Systematic botany seeks to simplify matters by dividing into orders and classes all creatures of the vegetable kingdom, and the system of classification now universally adopted is the natural system of Lindley, or variations of it by De Candolle and Jassieu.

Hence we have classes, sub-classes, natural orders, genera, species, varieties, and sub-varieties.

The fruit in question, the "French prune," is a "variety" of the species known as *Prunus domestica*, belonging to the very numerous family or natural order, *Rosaceæ.*

Belonging to this species "domestica" are almost all the leading varieties of plums and prunes cultivated in California; but there are several other species of the same genus "Prunus," which are indigenous to the United States.

Prunus domestica is a native of Europe, although through accident, or hybridization, some of the finest varieties known, as Washington and Coe's Golden Drop plums, originated in America.

To the ornamental nurseryman or florist is due the fact of the creation of "sub-varieties." As an example, take the Lawson's cypress, or, botanically, *Cupressus lawsoniana;* there is also a *Cupressus lawsoniana variegata alba*, and so on. In horticulture, however, we never want any finer distinction than a "variety," and the varieties are now multiplied almost indefinitely, so that none but an expert can sometimes distinguish them, and he is occasionally nonplussed.

Here, then, are my reasons for objecting to the introduction of another phrase, "type," which is, practically and scientifically, devoid of any meaning or significance whatever.

The late Charles Downing accomplished a great work in classifying and describing the known varieties of fruits cultivated in this country and in Europe; but the most casual observer will notice at once the great number of synonyms tacked on to some of the fruits described. For instance, the variety under discussion is known in different parts of Europe as "d'Agen," "Prune d'Ast," "Robe de Sergent," "Agen Datte," "St. Maurin," "Prune de Brignole," and "Prune du Roi." Downing selects the name "Prune d'Agen" as correct, which coincides with Mr. W. B. West's conclusions when in France. "It is," says Mr. West, "undoubtedly the prune of Agen, cultivated there exclusively and in great quantities."

But nowhere do we find the name "Petite" or "French," both of which are of purely Californian origin. It is deplorable that we in California should have done so much to aid the already existing confusion in pomological nomenclature. And we are still at it. Notice the daily dispatches from the East giving account of the fruit sales. The Chicago fruit dealer can sell a box of Hungarian prunes at 60 cents, but if the same is labeled "Gros prunes," he sells it at 95 cents. Neither name is correct; the variety properly is Pond's Seedling.

A cut of the "Prune d'Agen," in "Downing," shows an outline, which, together with the description given, exactly coincides with the fruit raised here as "French" or "Petite" prune, samples of which are now before us.

The question is asked, "Have we the true type of French prune in California?" I answer, positively, "Yes." As an illustration of "types," I show you samples of French prunes from the same stock, grown under different conditions.

[Samples of prunes, green and dried, here shown.]

These prunes, some of which would be, when dried, little more than skin and seed, and some as fine and large as any prune ever seen, are all from the same stock, and the great difference is merely caused by difference in soil and the number of prunes on a tree.

We have, however, another distinct variety of French prune in California, of which I do not know the name. I have failed to get samples for the meeting, but show you a water color sketch, copied from the fruit last year. This is the variety which has been called "Robe de Sergent" in the nurseries here, but as Downing gives "Robe de Sergent" as a synonym of "Prune d'Agen," it cannot be correct. It does not answer to the name "Robe de Sergent," being of a uniform color and more somber looking than d'Agen. Its growth is similar to d'Agen, but coarser and stronger, and the leaves are larger and much more shiny. I obtained some stock direct from France, and some also of the stock imported by John Rock; they proved to be identical. It is rounder than d'Agen, with one side enlarged, and is more decidedly a clingstone, and more juicy.

I also show you a water-color sketch of the "Prune d'Agen," showing its different "types"—using the term advisedly—as I have been at some trouble to get samples from different trees, all raised by me from the same stock, and clearly proving the great variation in size, as well as a marked difference in outline, under different conditions.

The same prune about Napa City, and anywhere in the vicinity of the bay, is of a dull, purplish color; while those raised in the hot, sunny climate of Calistoga, at the upper end of Napa Valley, become a vivid crimson, some being beautifully mottled, readily explaining why the synonym "Robe de Sergent" should be applied to it.

It is no doubt that different *grades* of prunes receive different names *commercially*. "Grading" is a legitimate commercial phrase, while "type" is misleading and useless, as it presumes to create a distinction other than a variety.

It is the prerogative of the California State Horticultural Society to decide these questions of pomological nomenclature; but we cannot control the commercial branding of the different "grades."

I consider the question of the correctness of the variety generally cultivated here as "French prune" clearly proved, but suggest that we follow Downing and call it simply "Prune d'Agen." *Commercially* it will still be "French prune." Also, that the Standing Committee on Nomenclature be instructed to examine the prune which is being called "Robe de Sergent," and give its correct name.

I am indebted to Mr. H. L. Gibbs, of Calistoga, for the finest samples of d'Agen prunes.

Since writing the above, I am convinced in my own mind that the prune called here by nurserymen "Robe de Sergent" is really the "Prune d'Ente" of Bordeaux.

LETTER FROM FELIX GILLET.

The subject to be discussed at the August meeting of the State Horticultural Society being the "Plum and Prune," I would like to make a few remarks and offer some suggestions, and, at the same time, correct some wrong notions in regard to the prune industry, which is assuming such immense proportions in our favored State.

First, I would call the attention of our prune growers to the fact that overconfidence and blowing are more apt to injure than help the development of the prune interest on this coast. "There is no doubt," exclaims exultantly one of our over-enthusiastic prune growers, "of the superiority of California prunes," and we are yet to grow prunes of the *d'Ente* or *d'Agen* variety that would grade twenty-four to thirty, thirty to thirty-five, thirty-five to forty to a pound, as the three first grades of that prune do in the d'Ente district of France. Some others, after comparing their own grown and cured prunes with those French imported ones, as we find them in San Francisco stores packed in fancy boxes of one kilogram (two and one fourth pounds), at the very *low* price of 75 cents per box, came to the conclusion that theirs beat the best cured French prunes, ignoring the fact that these imported prunes are all of the fourth and fifth grades, or "first grade *for exportation*."

But on the curing, manipulating, and packing of the prune, as done in France, the ignorance of our people is so manifest that I believe it is rendering our prune growers a service to call their attention to the way the French handle that great product of the southwest of France. The fact is that our fruit growers should employ more care in picking, curing, grading, and packing their prunes, if wishing to clean out the French imported goods from the American market, compete with them abroad—in fact, extend the scope of their exports. Of course, duties on imported prunes, as it is wrongly suggested for raisins, might be raised to such figures as to exclude the importation of prunes altogether from this country. This would compel the consumer of the prune in the United States to purchase from us our prunes in whichever way we would put them on the market, but I do not think this is the right way to help and develop this great industry of the Pacific Coast.

FRENCH PRUNE DRIERS.

Until Mr. Klee, at a recent meeting of the society, read a translation of Mr. Issartier's paper on the preparation of the *Prune d'Ente* in France, as read before the *Concours Regional* of Agen, in May, 1886, almost every one in California had an idea that the French dried their prunes in bread ovens. Better informed people, or those who should be better informed, do or did share in the same delusion. "The fruit grower in France dries his fruit in an oven sufficiently to keep about two weeks without molding," said Mr. Aiken, in an essay on the prune, read before the Fruit Growers' Convention a year ago. Now this is all wrong. It is true that the small fruit grower, the peasant who owns but a few trees, does put his bread oven to good advantage in drying his little crop of prunes; and a bread oven cannot dry more than five hundred kilograms, or about one thousand one hundred pounds of prunes a season, that is, turn out more than the above quantity in dried prunes. So the large growers who turn out as much as seventy thousand pounds of dried prunes (and not half dried, as wrongly stated by Mr. Aiken) have to use driers, and indeed have been using them ever since 1837. At the present time there may be a hundred different patterns of driers in the prune district of the Lot, in France; and it is quite a sight to witness as many as twenty to twenty-four of those various driers competing every year for premiums at the *Concours Regionaux* of the great prune centers of the Lot, such as those of Clairac, Montclar, Villeneuvre, Bergerac, etc. A *Concours Regional* in France is pretty much like one of our district fairs, with the exception of the holding of horse races and horse gambling, which is not allowed there; the *Concours Regional* being simply an agricultural and horticultural *competing* fair, as its very name, *Concours*, implies. Every year the French are improving on their driers, and in the face of the ever-increasing opposition to their great product from other European prune centers and California, they are striving to turn out a finer article still at cheaper prices and under *new forms*. My last information from the prune district of the Lot, and I am trying to keep myself well posted on anything going on there in regard to that prune business, of such personal interest to me, is that since the invasion of the phylloxera and the destruction of vineyards in those departments comprising that prune district, and the surrounding departments, too, the grapevines have been taken up by the root, and large quantities of prune trees planted in their place. This is bound to create an overproduction, for which a new market is already sought after. My informant writes to me that many large growers propose to handle their crops in the following manner: Three grades are to be made of all the prunes, the largest ones, from twenty-four to fifty prunes to a pound, for which there are special rates, with always a good demand, will be sold in their bulk to the prune merchants; the second grade, at fifty-five to seventy per pound, are to be packed in fancy pasteboard boxes, with glass covers, and sold at 70 cents per box wholesale, and 5 francs or $1 retail, the box to be made to contain two and one half kilograms of prunes, or five and one quarter pounds. As to the third grade, or *fretin*, or smallest prune, seventy-five to one hundred and ten a pound, they will be worked up in two ways, viz.: Either sold to distillers to be turned into brandy, which is said to be delicious, and with as fine an aroma as Cognac, or turned out into preserve or *confiture*, which requires as much sugar as pulp to keep, and put in pots or small glass jars of five hundred grams, or one pound and two ounces, to be sold at 10 cents per pot wholesale. The United States, as usual, is the main objective point for those new or overproducts of the French prune grower.

THE APRICOT IN FRANCE.

Though the apricot is foreign to this prune discussion, I would right here, in speaking of the planting of so many prune trees in France, put a flea in the ear of our apricot growers and canners. In the valley of the Rhone, in France, the home of the apricot there, and where the phylloxera has caused such a ruin among vineyards, immense quantities of apricots are planted in the place of the grapes, and "canning" resorted to. Canned apricots from California have already found their way not only to England, but also to France; in the latter country, I suppose, an object of curiosity. Well, the French did smile at the poor quality of the California article; they are going at it now, but using glass instead of tin, and "putting up" only their very best fruit, keeping the smaller and inferior one for confectionery purposes, to make that delicious "apricot paste" which requires such an enormous quantity of apricots every year. I hope that our apricot growers and canners will take the hint, if wishing to extend the scope of their exports and put their goods on foreign markets.

HOW PRUNES SHOULD BE HANDLED.

The *Prune d'Ente* should never be picked from the tree, or shaken down, unless perfectly ripe; and never put to dry before being in a withering condition. This is the great secret for obtaining sweet pulpy prunes with a jet black color, as are the best French dried prunes. But here, I understand that the fruit is often gathered all at once, ripe or not ripe, and cured in that state of unripeness. This method may be expeditious and cheap, but it is certainly wrong. Let our prune growers well remember that the beautiful black color of the French prune, its exquisite flavor, and pulpy condition, is due above all to the complete maturity of the fruit. In regard to the flattening of prunes, which are used on the top of boxes or the sides of glass jars, fingers are no more used for that work. For years the French have been using cylinders coated with a good thickness of India rubber, which do the work so much quicker and nicer. Pressing prunes in boxes and barrels with the feet has also been done away with; a machine named Pagueuse does the work now.

As to the packing in pasteboard boxes, zinc canisters, glass jars, and the like, the prunes, just before packing, are put at a temperature of 120° Centigrade, and sealed up tight at once; so packed they will keep years, and may be exported to warm as well as temperate or cold countries.

More than a hundred vessels leave Bordeaux every year loaded with the precious merchandise from the Lot, the chief countries of export being the north of France, Belgium, England, Holland, Germany, Russia, and *more particularly* the United States.

The prune merchants in Agen and Bordeaux have their own way of preserving and packing the prune, which they keep *secret*, and it is very hard, unless paying well for it, to get at any of those secret and personal ways of preserving and packing the prune, without having to cook it as hard as a Sacramento Valley prune.

NAMING OUR PRUNES.

Before concluding my remarks on this prune subject I would like to make a suggestion to our prune growers and shippers; it is simply to call by its name our California grown prune. In fact, why should we call it "French prune?" That is no name at all. In the first place, there are several different families of French prunes. I have myself eight or ten varieties, blue, red, yellow, all colors and shapes, such as d'Ente, St. Catherine, Perdigron, Dame Aubert, Duriman, etc. I would, therefore, propose that our "Petite prune d'Agen," more commonly known under the name of "French prune," be called "California prune d'Ente," and that our shippers label it so, for it is a true type of the d'Ente family, and California grown.

THE APRICOT.

Essay by Judge W. C. Blackwood, Haywards.

The apricot is said to be native to Armenia in Asia, and introduced from that country into Western Europe by the Romans. It is on its native stock a long-lived tree. Mr. John Wolfskill, of Winters, told me some years since that at Santa Fe, New Mexico, there were trees eighty or one hundred years old still vigorous when he knew them, some twenty years since. Cultivated on the peach-root, I am unable to say how long they will last. In an orchard I planted some thirty years ago, there were some apricots on peach-stock. The most of these trees are still there, and seemingly as vigorous as ever.

SOIL AND CLIMATE.

A moderately moist loam is the best for the growth of the apricot. Too much moisture is ruinous. A clay soil is not good. The tree seems to thrive best where it has a moderate exposure to the ocean breezes and genial warmth of temperature; hence the wonderful success which has attended its culture around the bay of San Francisco and coast counties further south. Its cultivation has never been made successful in the Atlantic States, and it does not succeed very well in many of the interior counties in our own State. The climate of the interior seems to be too dry and hot, and if artificial irrigation is resorted to there the gum disease develops, and the fruit, when ripe, is watery and deficient in richness.

When climate and soil are favorable the tree is subject to few diseases. In the vicinity of Haywards, where the tree has been successfully grown now for thirty years or more, no disease has ever developed, and it is singularly free from being attacked by insect pests.

VARIETIES.

The books describe some twenty or more varieties, many of which have been experimented with in this State, and the most of which have been discarded as unprofitable for general market purposes. Of the older varieties cultivated in this State none seem to retain their hold on popular favor except the Moorpark and the Royal. The Hemskirke, the Breda, the Peach, and Du Bois' Early are no longer cultivated to any extent by nurserymen in this State.

Then we have some new varieties to which public attention is occasionally called. The St. Ambroise is a new variety. From what I have seen of it I think it hardly equal to the Royal. There is the Siberian or Russian, favorably spoken of by nurserymen of Kansas. It is about the size of the Breda. Its chief excellence seems to be its hardiness, and it is said to stand as much cold and frost as the peach, and blossoms about the same time. It probably will now become popular in this State. There have been some new varieties originated in this State. Of their claims to popular favor I know nothing and can say nothing.

The Moorpark originated in England. It is an old and highly esteemed variety for its enormous size and excellent flavor. In some portions of the State it is said to be a regular bearer, but in the country around the bay it is an uncertain bearer, producing full crops only once in four or five years. For canning purposes it is objectionable by reason of its ripening on one side first, but for drying it has probably no superior.

The Royal, introduced into this country from France, is for all purposes, perhaps, the best apricot cultivated by our orchardists. It is an immense and a constant bearer, and, when the fruit is properly thinned, it attains a full medium size. It ripens evenly and assumes a rich orange color with a red blush on the side which is exposed to the sun in ripening. It does not commence to decay as soon as the Moorpark—in fact, I have seen it dry on the tree instead of rotting. For canning or shipping long distances it has no superior, and, when dried, it makes a beautiful light-colored fruit; and, as for flavor, it is among the best.

The Blenheim is another favored variety. It is of a beautiful lemon color when ripe, and in size about the same as the Royal. The skin of the Blenheim is very tender and is easily broken. As for flavor, I think it has no superior. It is valuable for canning or drying. The tree is a vigorous grower, covering itself well with broad leaves, but when young is apt to cast the most of its fruit. When it obtains age it bears well and seldom needs thinning out. There is another variety of apricot, called by some the "Blenheim." This variety bears quite young, is a good apricot; but not as vigorous a grower, nor is the foliage as dense as the first variety I have described. From descriptions found in the book I think it is not a true Blenheim.

In conclusion, I would say California would seem to have a monopoly of the apricot business, although it is grown in some other portions of the United States. When properly dried, it is among the best of our cured fruits, and among the canned varieties it has no superior. The cultivation of the apricot in those portions of the State adapted to its growth will, I think, always be profitable to the orchardist.

DISCUSSION.

A general discussion on the apricot followed the reading of Judge Blackwood's essay.

Mr. Hathaway, of San Lorenzo, said he had been told by one of the large canners that he regarded the Blenheim as the coming apricot for canning.

Mr. Coates, of Napa, exhibited samples of apricots—Royal—of large size, dried in his fruit drier in four hours. Some other parties had dried Royals by the same process in two and a half hours. The market demands bleached fruit, and as long as it does it will have to be supplied. There is a growing prejudice against the use of sulphur in bleaching fruit on account of its destroying the flavor. Fumes of sulphur are injurious unless used with great care. The public will have to be educated to natural-colored fruit. Dealers all demand bleached. The fruit he exhibited had not been bleached through any sulphurous process. Usual time for drying apricots in driers is from eight to twelve hours. He has done it in from two and a half to four and a half. Driers usually do two batches in twenty-four hours. In the sun it takes two days or more.

Mr. Shinn: What are the best varieties to be grown in this State? Shall we ship East or dry fruits? All these are proper subjects now for discussion and the subject cannot be exhausted. One variety may be best for canning and another for drying. He had seen dried apricots from Ventura County at the Mechanics' Fair, did not know what variety, but larger than those shown. He was told that the grower had dried one hundred tons; sold it at 25 cents per pound at the wharf. Subject of dried apricots exceedingly interesting. Apricots are selling now at $30 per ton; if dried can they be sold at 15 cents per pound? We have all the world a market for our canned goods. There are but few countries in the world where the apricots are produced at all—Spain and Portugal the principal countries. Year after year the demand for apricots from the Eastern States increases. As to what section of the State is most fit for their production, it is said the coast counties have a great advantage, and that the interior and southern parts of the State are less suitable for them.

Judge Blackwood regards the Moorpark, where it succeeds regularly, as the best and most profitable apricot grown in the State. It is large, rapidly handled, rich fruit. It always finds a ready market because of its richness. He regarded sulphuring fruit as a damage, but trade demanded bleached fruit. Had talked with a dealer who told him to sulphur fruit twenty minutes. It would not be fit to eat when cooked if done so long. They all want white fruit, but when a man uses bleached fruit once or twice, he won't use it any more. Now I hold that this thing of sulphuring fruit is just adding poison to the fruit according to the length of time you sulphur it. Sulphuric acid is deleterious to health, as every physician knows. Time is coming when this sulphured fruit will be dropped. I am going to dry fruit this year, and am going to sulphur it, but I don't like it. The Royal for all purposes will retain its place as a popular variety. It can be shipped long distances; will hang on the tree for a long time; it will wait some days for you to handle it after it is ripe; is a rich fruit. Blenheim known here by that name does not answer the description of the fruit by that name given in the books. My Blenheims are bright lemon color; skin is easily abraded—has got to be handled carefully, or shows bruise stains. It is good for canning; think it will be good fruit for drying. Is the Moorpark a good bearer?

MR. BLACKWOOD: Bears pretty regularly, it is said, in Ventura County. I have had trees in my orchard fourteen years, and but two crops from the trees. They do not pay for the room they occupy. This year they were very full; had to thin them out.

MR. SHINN: This is very important. People do not care to grow trees that way. Hemskirke is a good bearer. I never heard but a single objection to the Royal, and that is its size. Royals are very small this year. Blenheims are a degree larger. The Blenheim is about one half larger than the Royal.

MR. BLACKWOOD: Thin out the Royal, and it will be larger than the Blenheim.

MR. SHINN: I will suggest to young orchardists to make efforts to grow seedlings, and obtain just the kind of apricot for our use. To obtain seedlings, plant pits of Royals, and see if good qualities cannot be added to it.

MR. TOMPKINS: This thinning of Royals is a very serious objection; it is about as expensive to thin them as to pick them. The Blenheim is larger, and does not need thinning. It is uniformly much larger than the Royal; and, when dried, is better than the Royal. Thinning is a very serious objection.

MR. SHINN: Mr. Barbour, of San José, states that both the Royal and Blenheim, or Shipley, ripen uniformly, ripen freely, etc. I fear the St. Ambroise will be a shy bearer—more shy than the Moorpark.

MR. BLACKWOOD: Mr. Collins had me visit his St. Ambroise orchard, and showed me trees with fruit on. I would not recommend them. They are not as good as, and cannot be compared to, the Royal. They do not bear as well.

THE SHOT-HOLE FUNGUS.

The following letter was read:

CHICO, June 22, 1887.

Nothing would give me more pleasure and profit than to accept your invitation to be present at your meeting, and tell you "what I know about the apricot." But as tons upon tons of fruit will turn from green to ripe this week, it is necessary that some of us stay at home, and push things to save the crop.

The diseases of the apricot are very few, so far as my knowledge goes. Trees do and will die without any apparent reason. They usually leaf out in the spring, set full of fruit; afterward the leaves turn yellow, the fruit prematurely ripens, and the tree is gone. Sometimes this will occur around a defined spot, until one fourth or one half of an acre is left without a tree. I suppose these are alkaline spots, but why trees will do so very well for two or three years on these same places and then succumb, I am not able to say.

The "shot-hole fungus" is the worst disease on the apricot that I know of. The first I saw of it was four years ago, in an orchard one and a half miles from Rancho Chico orchards. I brought samples to Dr. Harkness, who was visiting General Bidwell at the time. He said it was a fungus of some kind, and thought it was to be occasioned by the very sultry north wind we were having at the time, and which was preceded by cool, damp weather. He was of the opinion that it would not spread to do much damage, but it has continued with us yet. A few weeks after finding the fungus in the orchard spoken of, I found on Rancho Chico two rows of very old Moorparks badly affected. They were right in the course of the wind from the other orchard. Two years ago I cut off all the tops of these two rows, and sprayed with strong soap and sulphur. There is now a good top and a good crop. Some of the fungus is to be seen, but it is not nearly so bad as before.

G. M. GRAY, Rancho Chico.

Mr. Tompkins: Fruits are not classified enough. One nurseryman will show you one kind and call it Royal; another will have a different name. Even in the best nurseries, vary from a large Royal to large Blenheim. They should be classified. Division of opinion over a peach from Chico last year as an instance.

Mr. Shinn: Fruits are in a perfect muddle in this State. The standing committee of State Board of Horticulture three years ago tried to work up this subject, but I expect we will not hear anything more about it. The American Horticultural Society worked many years for it and brought something out of it, but not very much. Any remedies for diseases?

Judge Blackwood: Dr. Kimball dusts with quicklime when the fungus is beginning to show itself. It is not deleterious to the fruit.

Mr. Wickson: It is probable that the sulphide whale-oil soap remedies for fungus for pear, apple, etc., would reduce the fungus on the apricot. Applications should be made in the winter time.

PROPAGATION AND PLANTING.

Mr. Tompkins: What are the best trees to plant—yearlings or two-year old trees?

Mr. Shinn: There is a difference of opinion in that matter. Apricots ought to be planted at the age of one year, although many prefer two-year old trees. It seems to me that a tree two years old is better able to bear the shock of rupture and removal than a younger tree. That is my philosophy, but the general opinion of planters is in favor of one-year old trees.

Mr. Tompkins: What root would you put apricot trees on?

Mr. Shinn: Apricot root is good for apricot. I advocate for each tree its own root, all other things being equal. I cannot be moved from that position. There are, however, exceptions to the rule. Situation may make an exception. Some pears may be best grown on quince roots. On certain classes of soils the apricot tree should be on the plum root, because the plum root will live in moister soil than apricot. Will make that exception. On my place there is a row of apricots grafted on plum, more than thirty years ago. The trees are not the size of others on apricot root, nor have they borne as full as those upon apricot or peach root. The apricot does well on the peach. If the land to be planted on is good peach land, put on peach root. One objection is that gophers like apricot root, while the peach root is too bitter for them. Must destroy gophers if they like apricot root.

Mr. Blackwood: Gophers work at night; travel at night. Make sure of him and that he is not there. They are hard to kill.

Mr. Shinn: As for age of trees, I believe cherry, apple, plum, and pears may be planted at two years, if the trees are not overgrown; they are better able to recover from the shock than yearlings are.

Mr. Blackwood: The apricot on the peach gives long life to the peach stock. In my old orchard I planted peach and apricot trees at the same time; the peaches are all gone and the apricots still vigorous.

Mr. Perkins: I have an orchard one half planted with one-year old apricot trees, the other half with dormant buds. They are now five years old and are all the same size. I did the same with the peach, and now the dormant buds are ahead.

Mr. Tompkins: There is other experience to the same effect. Trees in dormant buds set five years ago were ahead of one-year old trees planted the year before them.

Mr. Shinn: I never had good luck in transplanting dormant buds. Sent East for them, they being scarce here, but two thirds died; did not get as good trees as those budded here. They had been carried too far in dormant buds. Do not recommend that method. It will make sprouts very badly. You have to develop that bud, and, unless the sap flows pretty freely, you will not get the bud you want.

THE PEACH.

Essay by Gilbert Tompkins, San Leandro.

"THE PEACH—ITS CULTURE AND MARKETING."

The peach does best on its own stock in a light, rich, warm soil, and in a warm climate, moderately free from winds. At time of planting, the tree should not be more than a year old. Some prefer to plant trees in the dormant bud; others to plant seedlings where the trees are to be, and to bud to the varieties wanted in the following year. Authorities differ, as usual.

In fruit growing, as in all other work, everything depends on putting the right thing in the right place. Don't try to raise any kind or variety of fruit that some one else can raise twice as well with the same amount of work. Don't try to raise peaches for market unless your locality, soil, and climate will produce healthy trees, good fruit, and plenty of it. If the fruit has not been tried near you, try it yourself in a small way. Enough men have been kept poor by planting large orchards that never could pay except in the mind of the planter. Don't add yourself to the number.

All this applies not only to the different kinds of fruit, but also to the varieties of each kind. Take the Roseville Cling; it is a success at Suisun and a failure at San Lorenzo, where it curls badly.

As a general rule, the warm interior valleys—Vacaville, Winters, Suisun, Sacramento, Marysville, Fresno, Tulare, among others—will produce peaches profitably. The coast and bay counties will not. While there are many exceptions, this will do to tie to as a general proposition.

There are an enormous number of varieties, many of which are useless. Plant varieties that have a solid commercial value, either for shipping, canning, or drying. Combine all the good qualities you can and see that the chosen varieties do not ripen all at once. Consult your neighbors who are successful in the business and the nearest reliable nurserymen. Do not get rattled if they all give different opinions, but put your judgment to sifting evidence, and see who ship the best fruit and the most of it. Go slow, but do not be a clam. Energy is as necessary as caution; nevertheless, misdirected energy sometimes becomes recklessness.

DISCUSSION.

James Shinn spoke very strongly in favor of the peach in general as a profitable fruit to grow, and thought the essayist had pronounced a little too strongly against the peach in the coast valleys. Admitting that the interior grows the very best, it is not wise therefore for these places nearer the coast, which grow a good peach and do it profitably, to give up the culture. Of course, varieties must be chosen for local adaptations, and there are places near the coast which differ greatly as to their fitness for the peach. His own vicinity at Niles was about the same distance from the bay as Mr. Tompkins' at San Leandro, but he could grow a good peach at Niles; in fact, has known but one failure of the peach in the thirty-one years that he has resided in the district.

WHAT TO PLANT.

Essay by J. J. Pratt, Yuba City.

This is a subject that is foremost in the mind of the writer at all times. Our people are planting trees for the gain therefrom, and not merely to ornament their places and enable them to sell out to boomers. We are here to stay, and wish to reap the fruit from the trees we plant. Then what shall the harvest be? According to the kind planted, so shall be the fruit thereof. If we plant Early Crawfords we must expect to gather Early Crawfords, and if buyers do not want Early Crawfords, we might as well cultivate willows or some ornamental trees.

I do not presume by my own individuality that I am to say what to plant to a class of people who have spent years in the study of horticulture, and most of whom are now constant students of the subject; but it is from the fact that for the past four years the writer has been at that end of the fruit business where the final results are obtained. Have marked the principal varieties of stone fruits in most of the large cities of the United States, and have heard the results both pro and con, and if what has been learned is of value to any one the writer is glad to impart it.

The staple varieties of fruit are four in number: peaches, pears, apricots, and plums. Other varieties, such as cherries, nectarines, etc., and all small fruits, have only a limited demand, and that particularly in home markets. Of the staple varieties, four years ago the demand for apricots was estimated as seven times greater than that for peaches, then the next in demand; but each succeeding year has brought the demand for California peaches near that of apricots, not that the call for apricots is getting less, but that the peach is growing in favor each year, and this season that splendid fruit not only gained the front rank, but passed the demand for apricots.

The peach seems to be the one particularly adapted to our locality. The writer has made repeated tests and examinations of the canned fruits of other parts of the State, and finds that while we are able to produce a No. 1 article of pears, apricots, and plums, there are other sections that produce equally good. In Alameda County the Moorpark apricot matures to perfection, but it is fully a month later in ripening than it is in our locality, which brings it in with peaches and pears, and makes them difficult to handle. But we have a specialty—one that we can and do excel in. Nowhere in the world can the peach be grown to such perfection as here.

VARIETIES.

Now the question is, what is the best peach to plant? First, peaches are divided into four general classes: White Free, White Cling, Yellow Free, and Yellow Cling. The White Free is of no account for any purpose. Some of the White Cling, especially the White Heath, are very nice, and a good many fruit growers are planting them, but they make a mistake, for white peaches are very hard to sell. Yellow peaches, that are not half so large and fine, outsell them two to one. The Yellow Free has always been considered the best until canners overcome the difficulty of handling the cling. There is quite a list of yellow freestone peaches, each having some particular advantage over another. To speak of them separately would consume more time than is possible to spare at present. The Muir seems to have more excellences combined than any other freestone, but even that could not be distinguished by an untrained eye from some other leading varieties when canned, such as the Foster, Susquehanna, Picquet's Late, etc. But of all peaches, and of all fruits, there is nothing to equal the Yellow Cling. It sells on the market where nothing else will, and always brings the best price; will bear more handling, and will stand longer when ripe. When they are canned they retain their shape and color. The syrup always looks clear. In fact, they possess all the excellencies, and it seems strange that planters will continue to plant freestones. Of the Yellow Cling there are also many excellent varieties, each having some peculiarity that makes it better than any other. Under this head come the Tuscan, the Orange (several kinds), Crawford Cling, Lemon Cling (the large kind, the regular Lemon Cling being too small), the California Cling, and others.

TABLE GRAPE CULTURE.

Professor Hilgard: There is a grape seldom seen in the northern part of the State, but which is raised largely in France—the Malaga. It is rather sweet and tasteless, but has been shipped from France to Chicago and arrived in good condition. Not a large amount will sell well, but to a certain extent it will.

Mr. Tompkins desired to know how long the eastern grape season lasted.

Mr. Buck said they have a way of keeping their grapes and storing them away so that they keep longer than ours do, in to the winter even.

Mr. Tompkins desired to know when they marketed them.

Mr. Buck: Beginning at the South, they ripen by the first of September, and in the Lake Erie region and on the Hudson a little later. They have but little time in some localities between a ripe grape and a frost. More grapes are raised around Lake Erie than anywhere else.

The President thought we might adopt some of the ways they use East to keep grapes. They put them in paper bags partly to protect them and partly for the black rot. He used to keep them in that way in the East until Christmas.

Mr. Tompkins said, speaking of grapes ripening under foliage, they also colored well in paper bags.

Professor Hilgard spoke of the Cinsaut, a grape lately brought to this State, although the specimens were poor. It is a short-bunched grape and resembles the Malvoise in that it has a decided flavor, but not so decided as to make it like the Muscat. Every one who tries the grape is delighted with it. It is used as a shipping grape in France a good deal; if it cannot be shipped, it makes good wine. It should be tried more widely. It has been proved that it will not grow well on poor soils; it requires rich adobe soil. It gives one hundred and seventy gallons of must to the ton. Mr. Wheeler, who planted the grape on gravelly soil, found it was not a good bearer, but it is a good bearer on rich adobe soil. Would recommend it for trial.

MR. CANTELOW, of Vacaville, was not acquainted with the grape. He thought the Verdel a large grape, and, if allowed to ripen, a very sweet one. White Tokay is not a marketable grape. It does not take in this market; never tried it for eastern markets. The Cornichon with him is a poor bearer when short-pruned. He never planted it very extensively, and never considered it a very good grape. No variety of grape is better than the Muscat. When asked which grape he preferred for general culture, replied the Muscat. His variety is a little different from those in his neighborhood. He bought cuttings from Mr. Delmas, of San José. Few varieties better than this. He grafted all his grapes from that kind. He thinks it must be the Muscatel. The wood is thin, and grape is a good bearer, pruned either short or long. He has planted it extensively; it is liked both in this market and the eastern markets.

A member spoke in regard to Tiensing grape. It is very sweet; it keeps for four or five months. He had them last for three months in a very dry place. They came packed to us from China.

PROFESSOR HILGARD stated that it was a grape that they had been unable to fruit at Berkeley, but the fruit is described as very long-bunched. He is told that this grape is allowed to run over trellises and trees in its own country. Our grape has never set. It is an odd looking vine. Leaves are full of prickles; no one would take it to be a grapevine. The stem is also full of hairs. It belongs to a different species and genus. We need further information on the subject. We must pay a little more attention to the possibility of growing grapes that will answer for both wine and table like the Cinsaut. Plant so as to have choice between table-grape market and wine-grape market. Several varieties will serve thus and we should have few financial failures if we tried such varieties.

MR. BUCK spoke of grapes being in the eastern market as late as the first of April in good condition. They were probably kept in cold storage of some kind before they were shipped there. They get them very late in the season. Our grapes have better keeping qualities than their grapes have. We could do the same with ours.

MR. COATES desired to know what variety it is that comes from Spain and was kept so long in the eastern market, especially New York, and Boston, and London. It is kept all through the winter. Was it the Malaga?

PROFESSOR HILGARD stated that it was understood to be the Muscat of Alexandria. It is packed in cork-dust, which takes away all the flavor and leaves its own.

MR. COATES remarked that Dr. Strentzel, of Martinez, used carbonized bran. Tules have been used. Grapes have been kept for months at the East, and no reason why they should not be here.

PROFESSOR HILGARD: We do things in such a wholesale manner we have no time to devote to the little industries yet. Grapes must not be touched with the finger if they are to be preserved for any length of time. In Malaga they are picked by laborers who use shears that grasp the stem after picking it off, or allows them to be held by the thumb and finger without touching the berries. We can use all that care, but it is a question as to whether it will pay, as labor is too dear. He had paid 75 cents a pound for Malaga grapes in the East about Christmas time. In regard to carbonized bran, carbon is a very strong disinfectant and will take away all the flavor of the grape. Sugar-pine sawdust is the least objectionable, as it is almost entirely without flavor, but cork is considered the best. Found some years ago bark that could be used like cork, from the island of Jesso. Our cottonwood bark may answer for this purpose. This is one of the minute industries. We lose millions of limes and lemons every year because we do not make citric acid, and we have no manufactories for preserved lemons, or extracts, etc.

Mr. Tompkins said bran caked around the stem of the berry and was objectionable.

Mr. Coates thought nothing had been said in regard to keeping the grapes alive, which was the most important thing of all. The acreage of bearing grapes is decreasing, particularly in this part of the State. Few vineyards are in as full bearing as formerly in the northern and central parts of the State, on account of the phylloxera. The demand will increase for all fruits if they can be shipped in good condition and we have low rates of freight. What stock can be renewed for table grapes, which make large, coarse wood and overgrow the stock? That is the principal objection to the *Riparia* family. The Tokay is often claimed to be resistant on account of its great vigor. He has seen vineyards of all varieties killed except the Tokay. Can find that almost anywhere. Some in Vaca Valley have even used the Tokay as stock. The *Riparia* root is such a very small-growing stock that some trust to the *Vitis Californica.* The *Rupestris* grows to a nice large stock in a few years, but is very objectionable on account of the suckers.

The President: Both in number and toughness.

Mr. Coates: Mr. Munson wrote me about a new Mexican grape.

Mr. Klee: It is called the Woolly Riparia. They think it is a distinct variety. The leaf is woolly. It is growing at the University.

Mr. Coates: It is a strong growing variety, more so than the *Riparia.*

The President: The *Californica* has proved resistant in some parts of the State and non-resistant in others. They have had samples at the University put in holes from which the diseased vines just were extracted, and the vines are alive now and bear abundantly every year. They are on a very heavy, good soil. He is satisfied that the *Californica* should be placed in rather a rich and heavy soil, and then it will resist. There is no reason to suppose that one grape is going to resist everywhere. You use different roots on different soils for orchard fruits; the same with grapes. To my sorrow, I have quite a quantity of *Rupestris*, and have a stand of about one eighth of successful grafts. In *Riparia* about one half, and *Californica* 98½ per cent. It is on rich and somewhat heavy soil; the same as I found *Californica* growing on the hills in Napa and Sonoma Counties. I have no reason to change my opinion on this point. For the foothills, *Californica* would not be a success; other varieties should be used there. Had a conversation with Professor Viala, from Montpellier, France, in regard to resistant vines in France, where they have all kinds known. The *Californica* does not resist there. Upon inquiry, I found the soil was gravelly and rather poor. *Californica* will not resist in such soil. This subject of resistant stocks is a very important study which we have still to perfect.

Mr. Tompkins: On quite heavy land this *Californica* seems to resist well; is it so with other stocks? Do they resist on better soil?

Mr. Klee gave his observations on Mr. Thurber's place in Pleasant Valley. There are a few vines grafted on *Californica* root now living. All the rest were killed with phylloxera. Mr. Klee thought there was so much difference in the adaptation of these different varieties. *Rupestris* grows large and vigorous in the Briggs vineyard.

The President thought *Rupestris* grows well only in light soils, but would not be successful in as many soils as *Riparia;* that the *Aestivalis* grows in any upland and lowland, while the *Riparia* grows naturally on the lake bottoms and the *Rupestris* grows on the hill soils; no one vine will resist everywhere.

Mr. Coates desired to know about the parasites in vines.

Professor Hilgard thought a great many suggestions were needed yet to teach us what to do about resistant stocks.

Mr. Rixford said he had been told by Mr. Wheeler, of Vaca Valley, that they have been grafting Tokay grapes on *Californica* to get better fruit.

Mr. Buck: In grafting on any of these strong-growing grapes, you will find that the graft will root for itself unless you keep cutting off the roots.

The President: Graft on the surface; pull up the earth around it, and then afterward pull it away. *Rupestris* or *Riparia* especially. I do not believe in grafting underground.

Mr. Klee said he had about an acre of vines grafted on the *Californica.* They made a very strong growth, and gave no trouble whatever. In case of trouble they would have to be grafted above the ground. Nurserymen should take hold of this matter and have vines already grafted. If they had encouragement enough they might go into this business. They do that way in France. Graft them in the nurseries.

Mr. Cantelow had a large Mission vine on a trellis and wanted to change it. Put a number of buds into the canes of the previous year, and every one grew. He puts away cuttings in a cool place, waits until the sap begins to come up in the vine, and then puts the buds in by common budding as with fruit trees. He put in quite a number and every one lived.

Professor Hilgard: Do you wait until the buds begin to swell on the vine?

Mr. Cantelow: I put in the buds just as soon as the bark will slip, and before the sap runs too strong. You cannot do it in summer time. I use no precautions, and simply tie in the buds with string. I think a vineyard could be changed over in that way without any trouble at all. Never heard of it being tried before successfully. In lifting the bark at the right time you will find it will slip as easily as on a peach tree.

FRUIT DRYING.

Capt. W. M. Bramhall delivered an extempore address, of which the following is a synopsis:

The sixty million people of the United States consume about two hundred millions pounds annually of imported and California dried fruits, of which California supplies about one eighth. The disposal of the California fruit crop rests more upon dried fruit than upon any other form of use. The canneries use something less than twenty thousand tons annually. The shipments of fresh fruit aggregate not over twenty thousand tons, while to make the twenty-six million pounds of dried fruit of the 1887 crop, some fifty-two thousand tons of fresh fruit were required.

The readiness with which the leading varieties of California dried fruit are absorbed by the markets of the United States, all being consumed yearly in face of steady increase of quantity, proves that production has not yet overtaken consumption, and with increasing population we need have no fear of over-production of certain varieties during the lifetime of persons now living, if ever.

The leading factors in the popularity of California dried fruits are excellence of quality, greater cleanness than in foreign goods, and generally honest packing. The element of quality shows conspicuously in California apricots, prunes, and raisins; the two latter ranking with the best imported, grade for grade, and in some instances commanding a preference over the imported. Particularizing the varieties:

Apples will probably always be restricted to local coast consumption. High freights to the East, cheaper labor and fuel there than here, and a sufficient home supply of apples there of a character better adapted to drying, will shut us out from eastern trade, except in the rare years of short crop there and full crop here.

Apricots being practically a California monopoly of production, will always sell in the East and to any extent of production, the quantity and state of general fruit market regulating the price. The California crop of dried apricots of 1887 was over three million pounds, against about five hundred thousand pounds in 1886, and yet the crop went easily into consumption. The prices for 1887 crop were high, that year being one of a short fruit crop and general high prices in the East. The crop of 1888 is estimated at considerably less volume than that of 1887, but in view of a large dried fruit crop in the East, the market for apricots opens at somewhat lower prices than that of last year.

THE USE OF SULPHUR.

The popularity of the dried apricot, while maintained by its rare flavor, has been primarily established by the beautifully attractive appearance of the fruit produced by the sulphuring process. "Sulphur bleaching" is a misnomer, the effect of sulphur fumes being not to bleach or create a color or shade, but simply to *fix* the natural color. Fruit dried wholly in a dark evaporator, whether sulphured or not, is more or less bleached or changed in color, but this is the result of exclusion of the light, and not of the action of sulphur.

Over-sulphuring, while producing beautiful appearance, is injurious to the taste of fruit, though no instance is recorded in medical or other records of any injury, fatal or otherwise, to health from eating over-sulphured fruit. The offensive taste probably prevents its being eaten in quantities sufficient to injure health. But the sale of fruit is hurt by the over-sulphured article, and great care is needful to avoid this error in treatment, There is no occasion to over-sulphur, as is shown by the fine effects produced by so many of our driers, who use the process without any deleterious effects to either the appearance or flavor of the fruit. An allowance of one heaping tablespoonful of powdered sulphur to every fifty cubic feet of sulphur-box space, completely burned, with ventilating holes at top of chest to carry off the fumes, and an exposure of the fruit for twenty or thirty minutes to the fumes according to ripeness, will "bleach" apricots perfectly, not taking away the natural flavor nor adding a permanent sulphurous smell or taste. The greener the fruit, the longer exposure necessary to fix the color. Very ripe fruit, at about the "runny" stage, is often restored to a perfectly rich color with even less than twenty minutes sulphuring.

What the market thinks of sulphured versus unsulphured apricots, is shown by prices on the street to-day. Sulphured fruit is in demand and selling at 15½ cents for fancy, bright, large, fleshy apricots; down to 10 cents for small or badly sulphured and badly graded fruit, while unsulphured is not inquired for at all, and is offered at 7 to 8 cents without takers.

Dealers are so close to consumers that the popular taste is almost immediately reflected in the wholesale buyers' demands. If the taste of consumers in the East is condemning *all* sulphured apricots, the fact is not yet known to buyers. We can change our processes when necessary, but it does not seem prudential to reduce our selling prices one third to one half unless buyers force this loss upon us. My opinion is that sulphured fruit will hold the field, especially after all driers learn the loss which will eventually come by over-sulphuring.

OTHER FRUITS.

Berries, for the same reasons as those applying to dried apples, will probably always remain an article of local trade only.

Currants.—The dried currants of trade are not currants, but small grapes of the Corinth variety, made chiefly in Greece. The importations into the United States during the past year were twenty-nine million pounds. Not much attention has been given to growing them in California, but they will do well wherever the Sultana grape thrives. If the duty of 1 cent per pound be not disturbed, California might, in a few years, supply the United States with currants, and at a living profit, based upon average market price of 5½ cents per pound in large lots, at first hands over East.

Figs also have not yet been largely produced in California of the kind known as the Smyrna fig of commerce. After many experiments, the true variety seems now to have been discovered and the quality of the dried White Adriatic made at several different places in California compares most favorably with the average imported Smyrna fig. The 2 cents per pound duty upon figs is a factor of moment in encouraging and establishing the production of figs in this State.

DRIED GRAPES.

Grapes, apart from raisins proper, which the dictum of trade permits only in application to Muscats and Sultanas, are being introduced into eastern trade, and are received with great favor. The Mission, Black Malvoisie, and Feber Szagos varieties have for some years sold freely as dried grapes, and last year a quantity of wine grapes, chiefly Zinfandels, found ready market at prices better than their correlatives in the wine-grape market, and are sought for again this year. Preparations to dry every kind of wine grape are in progress this season, and a large output of them is expected. The consumption in the East of cheap "cooking raisins" is immense, and dealers have discovered that while the imported Valencia raisin is a very bad summer-keeper, the California article is a perfect keeper. Heavy losses accrue to holders of Valencias in some years from candying and rotting in the box, but Californias, as a rule, are so much better cured that they are safe to carry through into the second season.

Another possible outlet for dried grapes of the wine-making varieties may be found in France, into which country immense importations of foreign dried grapes are made for purpose of making into wine, and supplementing their own crops so seriously shortened by phylloxera. Dried Corinth grapes are quoted in French seaport cities at about the equivalent to 5 cents United States currency a pound. The inward duty is one half cent per pound, and other items of sea freight, insurance, interest, and commissions would, I learn, amount to about 1 cent a pound more. Some correspondence with French importers is in progress, and the experiment of shipment of dried California wine grapes will probably be made this season. If this trade can be opened to us we need have no fear of overproduction of wine grapes for generations to come, if ever.

Nectarines are not as yet a popular fruit in the East, but I have faith in their future when sold at reasonable prices. They have been treated heretofore as curiosities and held too high both here and in the East.

Peaches are and will continue of heavy sale at home and East. I believe in the so called "lye-peeling process," which, however, is evidently little understood and generally badly practiced. The common faults are to use too strong a lye, to keep the fruit too long in the lye, and not properly rinsing after. One pound of concentrated lye in twenty gallons of boiling water, an immersion of two seconds or more according to the toughness of skin, *rinsing thoroughly in running water*, then light sulphuring and quick spreading in the sun, will make beautiful fruit, which will bring the price of hand-peeled evaporated peaches. The proof is that certain parties in this State have been doing it for years, and wherever the process has failed it has been from one or more of the causes I mention. Properly speaking, the process should be called "lye-thinning" and not lye-peeling, but the latter name has been adopted and will I suppose stick.

Pears are not popular as dried fruit, but ought to be. Well dried, properly "hard ripe" Bartlett pears, in thin slices, properly soaked and cooked, would be a revelation to those who despise the fruit as they generally get it served.

Plums are another puzzle. There is nothing produced in the East like our California dried pitted plums, and plenty of people like them; but when they are plenty we get nothing for them, and the price is high only when there are few or none. Within the past ten years I have known the price to range in the Chicago market from 4 to 20 cents per pound, and always in the wrong way for us. The good demand East for fresh plums seems our only hope for escaping the necessity of cutting back 90 per cent of our plum trees.

Prunes of California production are assuming importance, more from their superior quality than for the magnitude of our crop. In the year 1887 the importations of foreign prunes into the United States were over ninety million pounds. The California crop of that year was some three million pounds. Of the foreign imported, fully 90 per cent are the common dirty Turkish prunes, from the Danubian countries, the price of which, even with a one-cent per pound duty, ranges somewhere about 4 cents per pound at New York. California prunes thus far have competed only with the imported French. Little by little, as our driers grew in knowledge and skill, the value of the California prune has crept up, until now, except in the high and fancy grades, ours sell at equal prices, size for size, with the imported, and choice lots of Californias sometimes command a preference and a higher price. The imported French prune is really a cooked article, either by being dried in a close heated oven, or steam-cooked in cylinders, while the California prune is simply dried as a rule. A few are being treated here as in France, and very high prices are got for them. The California prune is a better keeper than the imported French.

Quinces are not worth drying.

Raisins of California make are slowly but surely driving out the Spanish. Until California came into the field the Spanish raisin had the market of the world. The superior cleanness and the perfect keeping qualities of the

California article are steadily making headway against the imported, and if Congress will let the duty alone, we will, in a few years, almost wholly supply the United States market, even with Spanish labor and sea freights at one quarter of the same elements of cost in making and marketing the Californias.

Summing up, I perceive that, with a population of sixty million in the United States, California now furnishes but twenty-six million pounds of her dried fruit to their use; but I predict that our production will steadily follow the growth of population, and that it will not overtake it until the population has reached one hundred million, when we shall be supplying them with one hundred and fifty million pounds per annum of better, cleaner, and cheaper dried fruit than they ever had.

ACKNOWLEDGMENTS.

It affords me great pleasure to acknowledge with gratitude the valuable services rendered to this Department by Mr. Alexander Craw and Mr. J. W. Wolfskill, of Los Angeles; Hon. H. E. Van Deman, Chief Pomologist, Washington, D. C.; Professor E. W. Hilgard and Professor E. J. Wickson, University of California, Berkeley; Mr. A. T. Hatch, Suisun; Colonel J. R. Dobbins, San Gabriel; Mr. Frank A. Kimball, National City; Mr. W. H. Robinson, Stockton; Mr. H. P. Stabler, Yuba City; Mr. G. M. Gray, Chico; Professor H. C. Ford, Santa Barbara; Mr. N. W. Blanchard, Santa Paula; Mr. I. H. Thomas, Visalia; Hon. E. W. Maslin, Sacramento; Mr. Leonard Coates, Napa City; Mr. Felix Gillet, Nevada City; Mr. H. A. Brainard, San José; Mr. James Shinn, Niles; Hon. W. H. Aiken, Wrights; and many others throughout the State. It is highly gratifying to receive at their hands such hearty coöperation in this most important work now before us, laying aside all sectional feeling, and with the recognition that we are all citizens of California, identified in the common interests, conspiring together for the common good, each striving to promote the honor and welfare of the whole State.

Respectfully submitted.

B. M. LELONG,
Secretary.

PROCEEDINGS

OF THE

EIGHTH STATE FRUIT GROWERS' CONVENTION.

SANTA ROSA, November 8, 1887.

Pursuant to notice, issued by the State Board of Horticulture, the fruit growers of this State assembled at the Athenæum, in Santa Rosa, on Tuesday, November 8, 1887.

HON. ELLWOOD COOPER, President of the Board, opened the proceedings of the Convention by delivering the following address:

PRESIDENT'S ADDRESS.

LADIES AND GENTLEMEN: This will be the Eighth Fruit Growers' Convention, and the fourth held under the auspices of the State Board of Horticulture.

In calling the Convention to order, I have little more to say than to review somewhat the work that has been done, and call your attention to important questions which still require our careful consideration. At the three previous Conventions, of which our Board assumed the expenses and directed to a certain extent the exercises, we presented a carefully prepared programme. These programmes were conformed to systematically, thereby economizing time and enabling us to more intelligently discuss the various questions coming before the Conventions. We have no prepared programme for this Convention, as it was suggested at our last, held at Riverside, that it be left for this Convention to prepare.

After many delays over which we had no control, we succeeded in the completion of our last biennial report. It may not be out of place to state that I consider it the most important work of the kind ever published. To the California fruit grower it contains information about almost every kind of fruit, insects, remedies, and a diversity of opinions on some important points, which tends to strengthen our investigations and observations and prevent any serious mistakes. Said report contains the transactions of the three Conventions—one held in Los Angeles, November, 1885; one in Sacramento, November, 1886; and one in Riverside in April of this year—also valuable information by our officers and members.

I recommend to you this report, which has been published for the benefit of fruit growers, and which is to be had at our office, 220 Sutter Street, San Francisco.

In the report of the College of Agriculture, by Professor Hilgard, of the University of California, which I have perused with great interest, the Professor urges the importance of a State Entomologist, with his headquarters at the University. We have at previous Conventions passed resolutions asking an appropriation for this object, and I trust will continue asking until we succeed.

I must call your attention to remarks made in said report, on page 15, where the Professor makes use of the following language:

"A State Board of Horticulture and its executive officer are perpetually working in the dark, for want of the fundamental condition of knowing what it is they are really dealing with. When an officer of the State is heard in the nineteenth century gravely propounding the doctrine that certain insect pests originate by spontaneous generation," etc.

The language following the foregoing would indicate that I was the authority for the statement. It does myself and our Board injustice. This has been published in various newspapers throughout the State, and has done irreparable injury, because a correction of the statement could not possibly reach the same readers.

Whether or not new creations are constantly being made would not be profitable for us to discuss at this time, as the creations already made baffle our united efforts to keep in check. To those interested in olive growing I recommend, in addition to our last biennial report, the report of the College of Agriculture, 1887, pages 109 to 115, inclusive.

In a review of the speech of Senator Hiscock, at the Lyons Fair, State of New York, I was particularly impressed with one or two statements made: "That in twenty years agricultural implements have displaced 50 per cent of the muscular labor; the productions are more than doubled; and that, notwithstanding this displacement of manual labor, wages have increased 60 per cent; that the necessities of life, as well as the luxuries of civilization, are at their lowest prices in our history; that the first care of the government must be protection from internal anarchy and assaults from without, of whatever conduces to national prosperity; the education and happiness of the people should be encouraged; diversity of labor, so that the land will not be overburdened with workers; the protection of diversified industries, of labor, production, interchange of products, home markets, and home consumption—all essential to the maintenance of this great prosperity."

The tilling of the land and the gathering of the crops is attended with unnecessary difficulties, arising from inefficient and unwilling workers. This condition is caused largely by the political controversies of unscrupulous aspirants, who appeal and pander to the worst instincts of the unwilling and uneducated worker. If our Representatives, or law-makers, were imbued with the honest exertions of the fruit growers and farmers, a different state of things would certainly exist.

The interests of the poorest laborer and largest fruit grower are harmonious. One cannot have permanent prosperity without the other. We should unite in our political action, to bring about harmony between labor and capital. There should be no idlers. If all worked, and worked faithfully, this feeling of antagonism would soon pass away. We should make the wage worker feel that we have an interest in him, in his family, and every effort on our part for his best interests and happiness. Until we do this there cannot be much improvement.

Politicians who appeal to idlers and whisky to gain votes should be left at home; also those not self-supporting. Let us select from amongst ourselves representatives, and no matter how unwilling the task might be it would be a duty we owe to our fellow citizens to succumb. The difficulties that menace us by reason of antagonistic labor we should correct, and if each individual employer would take upon himself the determination to convince those engaged in his service that each have one common interest, and make them feel by practicable interestedness that we were willing to serve them in every way that would lead to their highest possible happiness, so far as the farming and fruit industries are concerned, and the laborers engaged in these pursuits, there would be a united feeling.

There never was a time when the horticultural interests in this State were so prosperous as now. We have had large fruit crops and generally sold at high prices. There has been less waste. Our people have learned how to take care of fruit, and really we have much to be thankful for. Freight rates and facilities for shipping have been granted by railroads, so that our markets have been extended and losses obviated. Our markets are increasing everywhere east, and if we continue to supply good, sound, well-prepared fruit, at reasonable prices, will still increase and insure our prosperity. In view of these various suggestions, the questions that are most prominent for discussion at this Convention are as follows: Insect Pests, Marketing the Fruit, Cold Storage.

It is not only necessary to know how to grow, and where to grow, but when grown how it shall reach the consumers. How to grow comprises the general knowledge of tilling the ground, planting, care of plants, and pruning. What to grow—the right varieties. Where to grow—the adaptability of certain localities for certain special varieties or kinds of fruit. This knowledge, with the further knowledge of how to keep insect pests in subjection, will not secure our prosperity without a united effort to place the fruit in the homes of the consumers at cheap prices. Our consumers are beyond the Sierras, from Nova Scotia to Puget Sound. A combined effort on our part to properly distribute this fruit is a necessary part to insure financial success. The fruit unions have done much toward solving this problem, and deserve great credit. The packages, and care in packing, must be controlled. Bad handling injures all. If cold storage will obviate fast railroad time, a great gain will be the result.

Regarding insect pests, we have made substantial progress. A greater interest has been taken, and many remedies have been energetically applied. This is the first step toward success. Fruit growers are informing themselves, and experimenting intelligently. There has been much progress made in experimenting with gas in Los Angeles County, and I hope the Convention will have the benefit of these experiments from the experimenters who are present.

Forest culture, in relation to fruit growing, should also have your attention. I refer you to the very able and interesting essay by Abbot Kinney, pages 118 to 127 of the biennial report.

It is a question whether fruit growing in many parts of the State can be made a success without planting forest trees to protect them.

All these matters are submitted for your consideration.

The President then announced the Order of Business, and declared nominations for Vice-Presidents in order.

On motion, Mr. P. W. Butler, of Penryn, and Colonel Mark L. McDonald, of Santa Rosa, were unanimously elected Vice-Presidents, and Professor E. J. Wickson, of Berkeley, Assistant Secretary.

COMMITTEE ON PROGRAMME.

Messrs. S. J. Stabler, of Yuba City, A. T. Hatch, of Suisun, Gilbert Tompkins, of Alameda, E. W. Woolsey, of Santa Rosa, and Mr. Shepard, of Sonoma, were elected a committee on programme.

The Convention then adjourned to meet in the evening at half-past seven o'clock.

Evening Session.

The Convention assembled at half-past seven o'clock on the evening of the eighth, to listen to the address of welcome. The citizens had selected

Dr. A. S. White, of Santa Rosa, to speak in their behalf words of welcome to those assembled.

President Cooper: Ladies and gentlemen, it affords me great pleasure to introduce to you Dr. A. S. White, who will now address you.

ADDRESS OF WELCOME.

Dr. White: Mr. President, ladies and gentlemen, members of the State Board of Horticulture, and of the Fruit Growers' Convention of California.

At our annual meeting one year ago, the County Association of Fruit Growers of Sonoma united with the Board of Trade of this city in a most pressing invitation that you should hold your next meeting in this place, and now that you have accepted that invitation and have added to the joy of our hearts by appearing here in such strength, it becomes us to set before you somewhat of the section of country in which we live, of its resources, capabilities, and present development.

The County of Sonoma has about twenty miles frontage upon an arm of the Bay of San Francisco, about sixty miles frontage upon the Pacific Ocean, with a bay at Bodega, and a number of shipping points along the coast. From these points, vessels laden with the lumber made in our redwoods have been shipped to distant ports, not only of our own country, but to South America, to Australia, and to the islands of the sea. It is a fact in history, that the very first sawmill ever erected in California was erected at Bodega Bay, and the very first shipment of lumber ever made to distant points was sent from that bay at an early day; since then that region of country has become very noted for its great fertility of soil, and for a time it stood unrivaled by any section of the coast in the production of potatoes, not only in regard to quantity, but in regard to quality; and after years of success in this department, as there was no competition to stimulate the inhabitants, they turned their potato fields into barley fields and into pastures for their dairies, and now much of the gilt-edged butter so highly prized, comes from that favored region. It is a fact, sir, that the Coast Range of mountains, within about fifteen miles of this bay, is depressed into mere round hills; between these hills are a number of exceedingly fertile valleys, well watered by springs and by living streams, many of them abounding in trout. This whole region is susceptible of the very highest state of cultivation, and I assert that the soil stands unrivaled by the soil in almost any section of our State. A little south of due east, sir, of where you are now sitting, grew the first redwood timber, and from that northerly it extended to the utmost limit of our county, and on still northward into Oregon. Between this region of redwood and the ocean there is a space of from one to three miles in width, extending the whole length of the county, susceptible of the very highest cultivation. It is used principally for pasturage, and there are some of the finest dairies of our State in that neighborhood; then to the eastward of the redwood section, to which I have alluded, comes in Blucher Valley, and a little north of that Green Valley, the very natural home of the berry of every variety. We have seen our streets crowded here with the blackberry and the raspberry and almost every kind of berry that we can name that will grow in this climate, from that region; but they are not confined to berries alone, it is the native home of the peach, the apricot, the plum, the pear, of the apple, in fact, all deciduous fruits flourish and grow to perfection in those sections; but, sir, we claim that in that redwood forest where the trees stand to-night in all their beauty and majesty, lifting their heads hundreds of feet above the roots, there is untold wealth, and as we shall see further on that forest is one of our principal sources of revenue as a county.

It is difficult to give the full estimate of the lumber capable of being produced in that section. Then, sir, all through this great forest there are beautiful valleys, that just so soon as this timber is exhausted, will furnish an inexhaustible supply of pasturage, and also an inexhaustible supply of all that can be cultivated in this climate. So that it is by no means to become a waste, in case this forest is cut away. Then, sir, following eastward and northward, we have one of the most beautiful little valleys upon which the eye of man ever rested. I refer to the valley of the Dry Creek; and I am most happy to be able to point you to some of the grapes that arrived this evening from that region of country, bearing the label of Mr. Chrystal. I call attention to these specimens of the product of that country, because I think they will compare favorably with the grapes from any other part of the coast, if they are not superior. Were it not for the fact that I am aware that Sonoma, Rincon, and other small valleys, little gems within themselves, each possess their peculiar advantages, I would say that Dry Creek Valley stands unequaled in any part of our county or State. Then, sir, when we turn a little eastward from the section I have described, there opens out the great valley, a part of which you gentlemen have seen in your passage to our city, called the Petaluma Valley, the Santa Rosa Valley, the Healdsburg Valley, the Cloverdale Valley, it is all the same; there is but one valley in the world, so far as I know, that surpasses it, or equals it in attractiveness. I refer to the Vale of Cashmere, celebrated by poets and travelers; but I maintain, sir, that although the Vale of Cashmere may be longer and broader, still it stands under the shadow of the Himalaya Mountains, that reach their heads into the regions of eternal snow, and from these heights come down chilling winds and blasts, such as we have no conception of here. Hence, I maintain that the climate, as well as the fertility of the soil, excels even the far-famed Vale of Cashmere. It is a fact that there they only produce the wool or mohair from the cashmere goat, which is woven into the most expensive shawls, while here, every fruit, every product of the climate, and of the soil, grow in the greatest possible perfection, and were we disposed, on these hills we could have the cashmere goat, and who will say that American ingenuity cannot weave as fine shawls, as costly a fabric, as they can in the Vale of Cashmere.

Then eastward of this valley we have the Sonoma Valley, exquisite and beautiful, and fertile as a garden. Then is the Los Guillicos; and then comes the Rincon Valley, Bennet Valley, Alexander's Valley, and, sir, I know not how many other little valleys, all neatly and romantically nestled in the bosoms of these mountains, to the east of it, and each one exceedingly fertile and productive; further on, we have the higher region of mountains, covered with a strong growth of black oak, the very best fuel that we have; and then, in addition to these forests, we have evidence that these hills and mountains were once covered with a great powerful growth of redwood, and through some process of nature these forests have become petrified beneath the soil, and hence we have the petrified forests, as though we had not forests enough. And, sir, in this region we have a great many medicinal springs; I know not how many; we can scarcely number them. You can scarcely drive a half day on many of these mountain roads, without encountering some spring celebrated for its curative powers; and there are a great many advantages in these hills that it is not perhaps wise to attempt to describe on this occasion.

There is one point to which I have not yet alluded: that, throughout all this region of country, we have no need of irrigation; nature has given us cool, clear springs of water from the mountains, and brooks filled with trout in every direction, and a river that enters a little eastward of the center and flows southward half way through the town, then westward into the ocean, watering all that region of country, so that we have a county that abounds in all that is essential for its growth.

Now, sir, this county has about one million of acres of land; two hundred and fifty thousand acres are adapted to the growth of vines and deciduous fruits of all kinds; one hundred thousand acres are adapted to the production of the olive, and about one hundred thousand acres are adapted to the growth of the chestnut. Why, sir, you have only to ascend this neighboring hill to see the olive and the chestnut flourishing on the verge of the hill, where under the surface you would hardly think there was soil enough for a tree to get footing, and yet there in a little while the olive will yield its fullness and the chestnut its abundance of fruit. There are twenty thousand acres, as I am credibly informed, in vines now; last year's product was two hundred and sixty thousand tons of grapes; the output of wine was over two million of gallons; and I am sure that this year it will reach three million of gallons. As we have but forty thousand inhabitants in this county, that is seventy-five gallons to every man, to every woman, to every child in our county. About six thousand acres are now orchards. Last year one thousand one hundred carloads of fruit were shipped from these orchards and I know not how much the increase will be this year, but a large number of young orchards are coming into bearing, others are being planted, so that the outlook in every direction is that we shall have a vast amount of fruit more than we now have. Last year about thirty million feet of lumber were made from our redwood forests; twenty thousand cords of wood were shipped; sixteen thousand cords of tanbark were sent to market; four hundred carloads of charcoal were made; five hundred carloads of posts, pickets, and grape stakes were shipped; five hundred carloads of shingles were marketed. The wool product of this county is about one thousand five hundred tons per annum, and about two hundred and fifty carloads of live stock are shipped per annum. The hop output is one thousand five hundred tons annually, with a prospect of a greatly increased amount in the near future. In hay, five hundred carloads were shipped last year, and, sir, let me assure you, that upon a personal examination of that field of the basaltic rock, it extends from below Sonoma City to the far, far north, occupying a space of about five miles in width, practically inexhaustible while the world stands, and the very best material for paving that has ever been found on the Pacific Coast; and I maintain that the day is not far distant when that rock will be used for building purposes, certainly for the foundations of our great, massive structures. Green corn, wheat, oats, and barley have been shipped to the amount of twelve hundred and fifty carloads. Besides all this, there is a large yield of butter, gilt-edged; of cheese, hides, tallow, and thousands of gallons of the very best milk, daily shipped to San Francisco, aggregating an annual income of another million of money. The poultry product of the county I am ashamed to name, because I fear that my word would be discredited, reaches up and up and into hundreds of thousands of dollars. The aggregate value of the products of this county is estimated at six millions annually, and it is being rapidly augmented.

I have alluded to the fact that our orchards, vineyards, hop fields, and other fields, yielding largely and contributing largely to the incomes of this county, are coming more and more into maturity, and their products will be doubled and trebled in the near future. We have four hundred thousand acres of bottom land, some writer has said, unsurpassed even in the Mississippi valley, part of what I think is true. The men that own the bottom land along the Russian River scarcely know what wealth is in their hands; they scarcely understand the soil; they seem so imperfectly to till; because it produces almost continuously immense crops, they are indifferent to its value. There are three hundred and fifty thousand acres of foothill lands capable of being planted into the vine, the olive, the chestnut; much of it producing barley and wheat and oats. There are two hundred and fifty thousand acres of swamp, mountain, and redwood lands.

Sonoma County ranks the fifth in wealth of the fifty-two counties in our favored State; but, sir, it will never rank lower in its future brightness. The time is not distant when she will stand brightest and brightest with the very wealthiest. The assessed valuation of its property is $28,000,000. The rate of taxation for the present year I am sure will not be more than $1 75 per hundred, including State, county, and even the city taxes, and the school taxes of Santa Rosa. We have, as I have already stated, a population of about forty thousand. These forty thousand will rapidly be augmented from accretions from abroad, for the excellency of the county is going to be understood in the Atlantic States, and it is not an infrequent thing that men come here from even New England inquiring for homes.

I have no time to speak of the flouring mills, the woolen mills, the shingle mills, the tanneries, the fruit driers, the wineries, the dairies, the gas works, the canneries, the planing mills, brick manufactures, foundries, both of iron and brass, marble works, and lime works; it is known abroad that all these industries are flourishing to a greater or less extent in our county.

Santa Rosa has ten churches, a college, three seminaries for young ladies, a commercial college, three kindergarten schools, and all grades of public schools, from the lowest to the very highest; and I maintain, sir, that these schools are manned, and if I may be permitted to coin a word, *womaned* with the very best talent in our land. Our schools, our public schools, are our pride; we commend them to the community and to the world; we believe in them most thoroughly; they are doing a work that challenges competition.

Santa Rosa has a population of about six thousand people. The property within the city limits is assessed at over $2,000,000; it will never be lower than this. In a few months it will have direct communication by rail with the great overland roads at Benicia, so that we can load our cars in Santa Rosa for New York, for New Orleans, for any part of our Union that we please; and, sir, we shall establish in our suburbs, immediately, the branch of our Soldiers' Home, and if Los Angeles, and San José, and San Francisco don't behave themselves, we will erect a University in Santa Rosa that will make the University of Los Angeles, the University of Senator Stanford, and of the State, tributary to this. We will do more than this, sir; we will build our roads to Bodega Bay; declare it a port of entry, if you please, build a city, and establish a line of floating palaces, attended with a convoy of common carriers to South America and to Australia, and to the other side of the globe; we will seize upon the commerce of the world and turn it across our country to New York and London.

But, sir, I come before you to bid you, and the society with you, a hearty welcome to our city, and in contemplating all these great interests, the thought comes over me that all these are concentrated here. I feel, sir, that I am but one great welcome from the very top of my head to the soles of my feet. I stand before you the personification of welcome from our Board of Trade, from our Fruit Growers' Association, and from all the citizens of Santa Rosa and of this county.

One word more: When you and your associates return to your homes, it is our desire, for we can wish you no higher happiness, that you dispose of your real estate and return here and cast your lot in with this great-hearted, magnanimous people, and share with us the common blessings that our Heavenly Father has spread around us; this is our heartfelt wish for you. Ladies and gentlemen, I thank you.

THE PRESIDENT then introduced COLONEL MARK L. McDONALD, who spoke as follows:

Mr. President, ladies and gentlemen, I shall not presume to attempt to address you this evening after that most excellent address of Dr. White. He has told our people that, although we have lived here these many years, there are many things that we did not know ourselves, and has brought home to us something that I have often thought of, and that is, the people who are situated in our favored county, in our beautiful valley, possessing the delightful homes that they do, do not themselves appreciate it, do not put the value upon it that they should; and a few such addresses will probably cause them to have a full appreciation of them; but, my fruit-growing friends, there is one thing that occurs to me to-night, and did, as Dr. White spoke of this grand and magnificent county, as he enumerated its products, not only into the hundreds, but thousands and millions, and that is, that we cannot but conclude that this county is almost an empire within itself, producing more than some of the States in this Union can produce; and the question arises, how does it happen that we have such a broad and extensive county; how did it happen that it was laid out so comprehensively, including everything perhaps that can be produced upon the face of the earth. Gentlemen, this county was laid out, was circumscribed by one of these very men that are visiting our brethren to-day; one that had been appointed by this commonwealth; and he is among us as one of our visiting members whom we are glad to entertain to-night. He was deputized by the Mexican Government to come and lay out the lines of Sonoma County, for he had made his home here and knew the resources and just how to lay out a county, to make it rich and make it comprehensive. We are favored with his presence here to-night, and I want you, after this meeting is over, to come upon the platform and meet the man who laid out this county under the instructions of the Mexican Government—I refer to General Vallejo.

THE PRESIDENT: Ladies and gentlemen, nothing gives me more pleasure than to introduce to you General Vallejo. I cannot say more for he is too well known among you. He will now address you.

GEN. M. G. VALLEJO: Mr. President, the Vice-Presidents, ladies and gentlemen. I would be glad if I could speak the English language correctly, but I will try and do my best, to speak a few words to you in my broken English. I desire in this connection to thank Mr. McDonald for having mentioned my name as a pioneer of this county. I had over a half a century ago a presentiment of the future of this (Sonoma) County, or Sonoma District, as we called it in Mexican times. Then it was composed of the present Sonoma County, Marin, Mendocino, Napa, and Lake.

I was then a young man. That is fifty-two years ago, I am eighty at the present day; but deducting fifty-two years makes quite a transformation. I was then young and very active, and the Government had a good deal of confidence in me, and sent me all over the country, from San Diego up to Oregon, to see which would be the best part of the country to open a settlement in. I went first up Kings River, as they call it now. We called it Rio de Reyes, it was like the Apache country, full of Indians. I had about seven hundred troops under my control, though I was then only twenty-one years of age, to go over to Salt Lake to make an inspection of all this country. I do not remember the names in English, but I came over near Marysville, crossed the mountains coming this way. The Governor, in 1835, after I made my report, sent me on another expedition, passing by the Straits of Carquinez to Vallejo, somewhere there, to inspect all this country, and I made my report in 1835, when General Figueroa was Governor; I told him the plain truth about the Russian River near by. Coming in this way, [pointing] I saw about one hundred and fifty Russians and Kodiacks on the Russian River, and then I found some other kind of people, not the kinds of Americans that are here now; they were coming in the other way. So the Government sent me here with one hundred and fifty troops to take care of the Yankee folks, and the Russians also. So I stayed here in Mark West Creek. General Figueroa and two engineers laid out a town there. He called a war council and asked the opinions of every officer, if any of them would remain here with some of the troops to settle the country, offering to give them one grade higher. A Lieutenant he would make a Captain, or a Captain he would make a Lieutenant-Colonel, and all that, but nobody spoke; nobody offered to stay. They feared the Indians. There were two hundred thousand Indians here at that time. I was then a young man, a Lieutenant; so I said, "General, I don't need anything, you give me the orders and I remain here." He says, "Vallejo, you write the orders." I took the paper and wrote the orders, giving instructions to me, and I remained there with some troops. After a little I found myself in rather a tight place, The Indians began to make trouble, and I sent a courier to the General, at Monterey, that I was in a very bad fix and was surrounded by Indians, but had no connection with the white settlers. So he gave me orders to select a point near the bay to have communication with the south. So I went down, though I liked this place better than any. But in my circumstances I selected Sonoma Valley and kept two schooners in Sonoma Creek to have connection with the settlement. That was when I was sent here permanently, and when I made my report I gave information in detail, not alone of Sonoma County, but of Napa and Yolo, and around. I laid out myself that old plaza of Sonoma into blocks like in San Francisco. After that I remained there. One day, the fourteenth of June, 1846, I was alone in my house, when about thirty or forty armed men, with rifles and coyote caps, regular mountaineers, surrounded me. A celebrated man among them was very tall, his name was Dr. Simple; perhaps some in this audience knew him. They took me prisoner; I couldn't help it. When you have eight or ten rifles pointed at your head, you can't make any noise, so by compulsion I made a trip with those people, to be locked up in the calaboose at Sacramento, by orders of General Fremont. After being kept there two months and a half I was allowed to come back home to see my family. My weight then was about ninety-six pounds.

But, right or wrong, Fremont came to the head of the Government, and stopped all this trouble; and soon after there were a half a dozen Governors—Commodore Biddle, General Kearny, General Fremont, Governor Stockton, and I don't know—it seems that everybody was a Governor. I was soon after nominated to be one of the Council by Fremont. Colonel Rousseau, a big man, about the size of my friend, Colonel McDonald, was the Secretary of State. Well, I was ready to go to maintain and to make laws or something, when General Kearny came and said, "Don't you go." He and Commodore Stockton came to my house, and I made him a present of a half a dozen horses, and he went by land, and Kearny took Fremont back. I know the history in Spanish, but I can't explain it in English—only to give you the points. At last, General Kearny was succeeded as Governor, and some other General came, and he went to Monterey; and then there was an election, and at last I went to Monterey as a Delegate to the Convention to form a Constitution. I did not do many things, but I helped right along, and belonged to the committee that reported the Constitution, which at last we succeeded in forming. It went to Washington and back again, and there was a proclamation of the Constitution, and I was elected Senator from this Sonoma District; and when it came to divide the country into counties, I was President of that commission. Nobody there knew anything about the country, so I kept the business in my head, and I made the Sonoma District, Siskiyou, Humboldt, Mendocino, Yolo, Napa, Clear Lake, and Marin. I selected the best land in the whole country, myself, and I say that is Sonoma County. And when I come now, beholding in my mentality, finding here these splendid ladies and gentlemen, civilization and society, Colonel McDonald, Mr. Cooper, and everybody else, I would like to have the power and wings to fly around the country, and see and shake hands with everybody, because this Santa Rosa was in my mind long, long ago, and I swear nobody saw it. I know the country well as far down as San Diego. It is very rich, but not like Sonoma; it is very good, but not better than Sonoma, and I defy contradiction; and no better climate is found anywhere. We have many places here where you may dig without finding a rock. On the Russian River, and in those mountains, there is lumber enough to build Paris, London, Madrid, and the whole world.

When my friend, Mr. McDonald, mentioned my name I felt that I should tell what I knew about Sonoma. I don't want to flatter Mr. McDonald, but he is a benefactor to this county. He has brought it out prominently before the people. The Pacific railroad which he is building we must have. He went to my house and said, "Well, General, we want the right of way through your land." To this I replied: "Colonel, if you want the road to pass between my gate and my house you have my permission, and I would like to see it pushed ahead. I am not a Yankee, but I am a kind of Yankee and a half, and I don't care if the improvements go over my head and stand on my neck, if for the sake of civilization."

I see among you my friend William Boggs. I knew him when he was a young boy; and his son, by the way, is the first California boy of American parentage born in this State. He was born in my house at Petaluma. He came to me with a young, handsome girl, and said he had no place to go. I had a good house in Petaluma and seventy thousand head of cattle and three hundred thousand sheep, and I told him, "You can take it." Isn't that so, Mr. Boggs?

MR. BOGGS—Yes, sir.

GENERAL VALLEJO—I hope you will excuse my English in trying to make a speech. I thank you.

Here the Convention adjourned till the following day at nine o'clock A. M.

SECOND DAY'S PROCEEDINGS.

INSECT PESTS AND THEIR EXTERMINATION.

The President announced the subject for discussion to be "Insect Pests, and their Extermination."

CODLIN MOTH.

(Spray and Band Treatment.)

Essay by E. J. WICKSON, University, Berkeley.

During the summer of 1887 careful observations have been made of the efficacy of spraying with arsenical compounds and of the band treatment for the reduction of the codlin moth *(Carpocapsa pomonella).* This insect appeared in the University orchard a few years ago, and during last year was quite abundant. The success reported by Prof. S. A. Forbes, State Entomologist of Illinois, in spraying with Paris green for the destruction of the larvæ as soon as it begins to feed in the calyx of the apple, and similarly good results reported by several California apple growers, suggested that a set of experiments with arsenic and its compounds should be made in the University orchard, where more time could be given to an accurate account of results than a busy fruit grower could devote to such work. As it was known that W. G. Klee, State Inspector of Fruit Pests, was conducting similar experiments on his own farm, and was keeping accounts of experiments by others, it was thought best that the University experiment should be given a direction similar to his, that the results of all experiments could finally be brought together and serve for purposes of a wide generalization. For this purpose Mr. Klee was invited to prescribe the applications to be made. He did so, and assisted personally in the preparation and application of the poisons—a service for which we make due acknowledgment.

Application was made of three substances, White arsenic, Paris green, and London purple, and each in different strengths, as will be specified in the tables which will be given below. The White arsenic was dissolved in hot water; the Paris green and London purple were kept as thoroughly stirred as possible while being drawn up by the pump. The drenching of the trees was quite complete, the spray being especially directed upon the clusters of fruit which in most cases was still upright, so that the drops of the liquid were caught and held in the calyx end. There was, of course, much difference in the size of the fruit, as the orchard comprises a large collection of summer, fall, and winter fruit. Trees were selected, however, as carefully as possible, which had the fruit of the best stage of growth, say from the size of a pea to that of a small marble, at the time of the first spraying.

The tables will show that in most cases three applications were given, all within thirty days from May thirty-first. During that period the records of the University meteorological observatory show that rain was measured but once, and then but one twentieth of an inch, and in the month of June there was but a sprinkle, even less in amount, so that the weather was perfect for the retention of the poison on the fruit.

The University orchard is planted with two trees of each variety, and in these experiments one was sprayed and the other reserved without treatment, so that a comparison, each tree with one of its own variety and age, could be made. The orchard was guarded in such a way that no outside interference could be had with the fruit. Twice a week all the fruit which fell from the sprayed trees and from the check trees, unsprayed, was examined and careful entry made in a book prepared for the purpose, of all worms found in the fruit, all fruit from which the worms had escaped, and the number of worms found under the bands of sackcloth, which were placed upon all the trees. This plan of procedure was faithfully carried out until November first, when all the fruit remaining at that time was removed from the trees, examined for worms, and the experiment closed.

The following tables show a summary of results. The full report, with details of procedure and deductions therefrom, is reserved for our next annual report:

Paris Green—One Pound to 160 Gallons of Water.

Fruit.	Variety.	Dates of Application.	Apparent Effects.	Worms in Fruit and Under Bands on Treated Tree	Worms in Fruit and Under Bands on Untreated Tree
Pear	Nouveau Poiteau	May 3 and 19	None	10	23
Pear	Nantais	May 3 and 19, and once later	None	4	4
Apple	Red Canada	May 3 and 19, and June 1	None	4	35
Totals				18	62
Gain, per cent				71	

Paris Green—One Pound to 320 Gallons of Water.

Fruit.	Variety.	Dates of Application.	Apparent Effects.	Worms in Fruit and Under Bands on Treated Tree	Worms in Fruit and Under Bands on Untreated Tree
Pear	Duchesse Precoce	May 3	None	3	8
Pear	Dr. Reeder	May 3 and 19	None	1	27
Pear	Chaptal	May 3 and 19, and June 1	None	6	1
Apple	Duchesse Oldenburg	May 3 and 19	None	0	1
Apple	Fameuse	May 3 and 19, and June 1	None	9	4
Totals				19	41
Gain, per cent				54	

Paris Green—One Pound to 160 Gallons Water, with Two Pounds of Soap.

Fruit.	Variety.	Dates of Application.	Apparent Effects.	Worms in Fruit and Under Bands on Treated Tree	Worms in Fruit and Under Bands on Untreated Tree
Pear	Beurre Gris d'hiver	May 3 and 19*	None	5	2
Apple	Wells' Sweet	May 3	None	3	3
Apple	Duchesse Mignonne	May 3 and 19	None	1	13
Totals				9	18
Gain, per cent				50	

* Considerable settling in can.

London Purple—One Pound to 160 Gallons Water.

Fruit.	Variety.	Dates of Application.	Apparent Effects.	Worms in Fruit and Under Bands on Treated Tree	Worms in Fruit and Under Bands on Untreated Tree
Pear	DeTongres †	May 3	Badly injured	13	21
Pear	St. Michael Archangel	May 3	Badly injured	4	
Apple	Disharoon	May 3 and 19, and June 1	Little damage	9	9
Apple	Yopps' Favorite	May 3 and 19*, and June 1*	Little damage	5	7
Totals				31	37
Gain, per cent				16⅔	

† Two and one half gallons of wash used.
* Strength of second and third sprayings, 1 pound to 220 gallons water.

London Purple—One Pound to 80 Gallons Water.

Fruit.	Variety.	Dates of Application.	Apparent Effects.	Worms in Fruit and Under Bands on Treated Tree	Worms in Fruit and Under Bands on Untreated Tree
Pear	Emile de Heyst	May 3 and 17*, and June 1*	Fruit and foliage damaged	19	6
Pear	Madame Treyve	May 3 and May 18*	Fruit and foliage damaged	0	24
Pear	Augustus Dana	May 3	Fruit and foliage damaged	0	4
Apple	Seek No Further	May 3	Badly injured	16	51
Totals				35	85
Gain, per cent				59	

* Strength of second and third sprayings, 1 pound to 220 gallons water.

White Arsenic—One Pound to 320 Gallons Hot Water.

Fruit.	Variety.	Dates of Application.	Apparent Effects.	Worms in Fruit and Under Bands on Treated Tree	Worms in Fruit and Under Bands on Untreated Tree
Pear	Callebasse Monstreuse	May 3	Foliage little damaged	4	3
Apple	Grimes' Golden Pippin	May 3 and 19		1	0

White Arsenic—One Pound to 480 Gallons of Water.

Fruit.	Variety.	Dates of Application.	Apparent Effects.	Worms in Fruit and Under Bands on Treated Tree	Worms in Fruit and Under Bands on Untreated Tree
Pear	Ott	May 3	None	0	1
Apple	Early Joe	May 3	None	0	17

White Arsenic—One Pound to 640 Gallons of Water, with Soap.

Fruit.	Variety.	Dates of Application.	Apparent Effects.	Worms in Fruit and Under Bands on Treated Tree	Worms in Fruit and Under Bands on Untreated Tree
Pear	Napoleon	May 3 and 20, and June 1	None	1	3
Apple	Hall	May 3 and 19, and June 1	None	0	No check.

These applications were all made to affect the first brood of the moth. The figures of infested fruit are all small, for in Berkeley, as in most places along the coast, at least, the first brood of the moth was unusually small this year. This fact would not necessarily interfere with the percentage of gain by the treatment.

In the case of the White arsenic the record of worms is so small and the result so contradictory, in that the stronger wash gave a percentage of loss, while the weaker gave a percentage of gain, the inference is that the worms were not on hand to be killed. Undoubtedly allowance must be made for chances of this kind in all experiments including only a tree or two. One codlin moth is said to deposit anywhere from fifty to two hundred eggs, and so a single moth by presence or absence might produce a great difference in an experiment. When the pest is abundant there is of course less danger of such results.

The experiments with Paris green and London purple are more satisfactory, as more trees are included, and worms are found on all, which shows that the moths visited the trees more freely. The percentages of gain must be considered very satisfactory, and the stronger applications, barring injury to foliage, produce the best results. In the case of Paris green, the application of a wash with one pound of Paris green to one hundred and sixty gallons of water must be regarded as very satisfactory, giving a gain of over seventy per cent of good apples and pears and not doing any injury to foliage or fruit. The susceptibility of trees to injury seems to vary with the kind of fruit, and the variety as well, and may be affected by other conditions. This is a matter which needs full investigation.

EXAMINATION OF THE BAND TREATMENT.

In order to determine some points about the efficacy of banding apple and pear trees for the destruction of the larva of the codlin moth, an accurate record has been kept in the University orchard during the past season. The bands were put on early and consisted of strips of old sacks. The strips were five or six inches wide; the ends were allowed to lap well, and the band was secured by a string tied around near the center so as to furnish crevices at both the upper and lower edges, to accommodate worms coming from either direction. All these bands were removed on a certain day each week, the larvæ counted and killed, and the bands replaced. At the same time all the fallen fruit was gathered, examined for worms, or to see if worms had escaped, and records of these facts kept separately. The full statement of this investigation is not yet ready, but a brief summary of leading results may be given as follows:

Row Number.		Larvæ Under Bands.	Larvæ in Fruit.	Other Damaged Fruit.	No. Trees in Row.
Pears	9	31	27	71	22
	10	42	58	142	35
	11	73	42	127	37
	12	125	34	180	38
	13	56	34	115	38
	14	137	34	226	39
	15	83	54	226	38
	16	45	19	95	15
Apples	16	4	1	19	17
	17	91	48	202	32
	18	57	14	102	25
	19	89	89	446	24
	20	163	61	320	26
	21	83	40	153	25
	22	32	22	81	21
	23	74	31	191	16
	24	3	---------	8	9
Totals		1,188	608	2,704	457

This summary shows that while two thousand seven hundred and four apples and pears were found from which worms had escaped, there were found under the bands but one thousand one hundred and eighty-eight, or 44 per cent; the remaining 56 per cent includes worms which found nesting places elsewhere, or perished. The assistant, who kept a record of this experiment, assures me that he believes many of these were eaten by birds, which were always working over the ground while he was in the orchard. The others must have concealed themselves under clods to spin their cocoons, for there is no loose bark on the trees, and no rubbish or fences in which they could hide. It would seem from this experiment that the bands catch less than half of the worms which gain access to the fruit, and yet the destruction of this proportion of fully fed and healthy larvæ must be considered very satisfactory. As all the losses by birds, or other enemies of the worm, by accident and by other agencies which destroy insect life, must be taken from the percentage of worms not found under the bands, it will be seen that the old method of treatment is still one of the most effective that can be employed.

MR. WICKSON: One word more, Mr. President; you have noticed in some of the papers a description of a plant which in New Zealand is said to be effective in killing the codlin moth. Mr. Maskell wrote to me about it and I see by the Santa Rosa paper that he also wrote to a gentleman on Mark West Creek mentioning a certain plant which they had obtained in the Cape of Good Hope, and which an apple grower down there found was catching the moth. The plant, sir, I have in my hand, and is one which we have been growing at the University some ten or twelve years, and it is somewhat distributed about the State besides; it is a thing that does catch moths and a good many bees, bumble bees and honey bees and butterflies, but we have never noticed the codlin moth, for our attention has not been especially attracted to that point, and it may have been; but the moth which seems most liable to catch in it is a moth considerably larger than the codlin moth, having a tufted sort of a moth. This blossom has an arrangement of its interior parts, which was described before the Academy of Sciences in 1881 by Mr. Stern. It is so arranged that the moth or the bee, in inserting the tongue to suck the honey, finds it easy enough to get it, but can't get out again; it is caught there by its tongue, the mechanism being something of this kind [illustrating]: You see two bars that will spread very easily like that and allow the tongue of the insect to come in, but when it comes to draw it out, these two parts come together in this way, and the harder the moth tugs the tighter he is caught by a little simple arrangement in the blossom. It is a long vine, grows sometimes ten or twelve and perhaps more feet high, which will climb up a tree or run along a fence; it has rather a pretty white blossom. Here is the fruit, described as something about the size of a goose egg. This part contains a good many seeds; as you open it, it would remind you of part of the old milkweed they have at the East—in fact, it belongs to the milkweed family. The report from New Zealand was that the apple grower there had a hedge made of this a number of feet long in the neighborhood of his apple trees, and he noticed that the codlin moth would catch there, and then the chickens would come around and catch the codlin moth; and he set the trap continually; that is quite a necessary point; because, if you don't have something to come around and unload your trap the blossom can catch just one, and it will stay there until it dries up. Our observation is that more bees are caught than any other class of insect, and perhaps the planting of this vine might settle the vexed question between the honey growers and the fruit growers; because, here is an actual bee trap, and there might be no legal objection for a man to plant it.

Mr. Gray: I would like to ask if the codlin moth is a honey-sucking insect?

Mr. Wickson: The codlin moth has to live upon honey or starve. The insect caught in this plant is the honey bee. The name of the plant is the *Physianthus albens;* it does not bloom the first year from the seed.

CODLIN MOTH REMEDIES.

Essay by W. G. Klee, State Inspector of Fruit Pests.

During the last year considerable experience in regard to the arsenical remedies or poisons has been gained, and, although we have by no means mastered the subject, we have learned a great deal in regard to their application.

STRENGTH OF COMPOUNDS.

In bulletins issued by me this spring, the strength of solution was left rather indefinite. Later on, in a bulletin issued after the Riverside Convention, it was given at one pound to one hundred and eighty gallons, as it was ascertained that all the samples that were procured in San Francisco market contained a very high percentage of arsenic; four samples averaging about 54 per cent of arsenious acid. If this percentage could be depended upon, the one hundred and eighty gallons to the pound would probably be the average, although, as will be seen later, this strength has proved too strong in some cases. At any rate, it is to be urged that a manufacture on a small scale, which could be depended upon, be established, or that a large quantity be bought—to be uniform in strength—in the East, and guaranteed by the manufacturers.

THE SAME STRENGTH AFFECTING DIFFERENT VARIETIES.

In my experience with the spraying early this season, it was learned very soon that different varieties of fruits were affected differently. Thus, I learned that as a general thing pears were less affected than apples; still there were exceptions to this also. Of common varieties, the Bellflower on my own place in Santa Cruz proved, for instance, very susceptible to the strength, one hundred and eighty gallons to the pound, causing leaves and fruit to drop. Rhode Island Greening was also considerably affected, but still made a fair crop. Mr. Trumbull, of San Rafael, and W. W. Brier, of Centerville, report the same result. On the contrary, the White Winter Pearmain was not affected, except a few leaves being burned on the edges.

The general spraying of my orchard was done the first time when the tree was well out of bloom, and the second time ten days later. A few trees, with the fruit just in bloom, were tried very early in the season; although a solution of Paris green—one pound to fifty-five gallons—was used, and of London purple of similar strength, the effect of this strong solution was not more noticeable than that of the later week's sprayings, and did not affect the fruit of either White Winter Pearmain apple or Howell pear, on which it was used. The explanation of this phenomenon must be that the surface presented by the leaves at this early date was much less than later on, when the weak solution was used, and that the rapid growth of the leaves dispelled the arsenic from its surface before it had time to act. This seems also to indicate that the fruit blossoms are much less affected than the foliage.

EFFECTS INCREASED BY MOISTURE.

That the effect of arsenical mixtures would be more severe in a climate where damp nights prevail, I became convinced of early in the season, and in my circulars of inquiry tried to elicit some confirmation in this respect, but failed to get it. My reason for concluding this was, that in the case of the Bellflower when the trees were located so as to dry off early in the day, the ill effect of Paris green was much less. Thus, from an outside tree we harvested from the less shady side of the tree five boxes of apples, while from the side facing the next tree in the row and surrounded on all sides by other trees, hardly an apple was taken, and while a portion of the tree in question produced so well, thirty trees adjoining and of the same side and same variety, produced but very little—in fact, only ten boxes altogether. It seems, therefore, that the moisture which naturally would remain longer in the more shaded part of the trees and the orchard as a whole, has the effect of leaching out the arsenic from the Paris green, and damages the foliage or the fruit spurs, causing the leaves to fall, and the fruit, in consequence.

HOW LONG DOES THE EFFECT LAST?

In this connection, the question naturally arises, how long does the effect of the poison last, and how long will it prevent the fruit from being attacked?

From personal observation in Santa Cruz Mountains, I believe that the effect of Paris green will last about two months, having seen it plainly where a heavy dose has been used, and no successful attack of the worms was made before that. As regards the London purple, Mr. G. W. Ousley, of San José, who experimented last year, wrote to me under date of August sixteenth, this year: "From close observation, it is my impression that London purple, if used every thirty days, will prove very effectual; but it will have but little if any effect after thirty days from date of using. In accordance with this, I have sprayed my pears four times with London purple, one hundred and sixty gallons to the pound. No injurious effect on foliage and trees." Shortly after this, I visited Mr. Ousley and found his pears almost entirely free, and he informed me that he had noticed an increase of worms the last two times he had sprayed.

As I must confess, that I would hardly regard fruit sprayed so many times as safe to eat without a test for arsenic, three samples of pears—Beurre Clairgeau, Beurre Bosc, and Winter Nelis—were forwarded for analysis to Berkeley, and also a sample of apples furnished by Mr. T. C. Settle, of San José, which likewise had been sprayed four times. The result of this analysis was, that not the slightest trace of arsenic could be found. From this I would naturally conclude, that no danger would exist from even four treatments with London purple, if rightly and carefully applied. On general principles I should, however, hesitate to recommend such an excessive use.

Analysis of fruit sprayed twice with Paris green has given no reaction; and, if done early and carefully, I believe it safe to the consumer; but the eating of fallen fruit should be most thoroughly guarded against during the first two months after spraying.

From what I have mentioned above in regard to the effect of moist nights on trees treated with Paris green, it would seem that in such localities the least danger of poisoning to the consumer could result from spraying, as the trees themselves would suffer if used too strong, each part of the tree which received too much naturally shedding its fruit, and, so to speak, refusing to take more than a weak dose.

LONDON PURPLE VERSUS PARIS GREEN.

From observation in various parts of the State, I am confident that the case of London purple versus Paris green, stands thus: The effect of London purple is more severe on the trees generally; and naturally, on account of its greater solubility and less poisonous character, less dangerous to the consumer if used only twice; but its effect as a protective, compared with the Paris green, is less lasting, everything being equal. It seems to be more applicable on pear trees than on apple. I believe that none of the compounds, if used carefully, are of any danger to the consumer, and that they are of much benefit to the raiser.

The present season has been, according to all accounts and personal experience, less productive of the codlin moth, especially in the early part of the season. Not only does this hold good in the coast counties, but also in the interior counties of the State. The effect of the spraying with Paris green has, therefore, been less noticeable. As a general thing, the first brood of the moth was quite scant, yet exceptions to this occur, as, for instance, in the locality where my orchard lies, where early apples in July were badly affected, and the clean condition of all my early fruit must, therefore, be attributed to the spraying, which in this case was done only once; and in August and September there was—at least in many of the coast counties—a great increase; so much so that parties reporting at the end of August only one fourth affected, changed it to only one fourth saved. This was the case when only one spraying of London purple was made.

In my own orchard the results have been very satisfactory, and stand about this way: Early varieties, sprayed once, Alexander, Early Harvest, Gravenstein, not one per cent affected; fall apples, as Greening, this being the worst, sprayed twice—one sixth per cent infected; Bellflower, 3 to 4 per cent; White Winter Pearmain, 2 to 3 per cent; Newtown Pippin, 4 to 5. It should be mentioned that bands were used all the season.

As regards the whale-oil soap and sulphide of potash, or soda, recommended by me this season, I am very favorably impressed with its effect, so much so that I intend to spray a large portion of my orchard with it next season. Five good-sized Winter Pearmains treated three times show hardly the presence of any worms. As this remedy is perfectly innocuous, even if not quite so effective, I shall prefer it for my own use, and where three sprayings are practiced I certainly should adopt this as the third.

Mr. Klee: There is one point, in regard to these arsenic remedies, I would like to have brought out: I have reference to the different effects on different varieties, and I should like to know if any person here has observed much difference in the effect of spraying. I am satisfied that I lost nearly my whole crop of Yellow Bellflower apples by two sprayings, while other varieties are unharmed, and I know of others that are in the same fix. I believe after awhile, by comparing notes, that we can ascertain just exactly how much these different varieties will stand. I think it is very desirable to bring that out, and I should be glad to have the experience of others on the subject.

A Delegate: Mr. Chairman, I used an arsenical spray for my orchard this spring, white arsenic, strength one pound to two hundred gallons, and it killed or burned a great many of the leaves and some of the fruit. My fruit fell off very badly, and I attribute it to the arsenical spray. A friend of mine, living about seven miles from here, had used the same spray on his orchard; but as Mr. Klee speaks of having lost his Bellflowers by reason of the arsenical spraying, and this gentleman had used the spray on all of his trees except his Bellflower trees, which he missed. I think he told me his spray ran short, and he just quit and didn't spray those trees. I was speaking to him about my trees, and he said he had thought so too, but he had those two or three trees unsprayed, and finding the fruit falling off so badly he was very glad that he had left those trees unsprayed, and went over and examined those trees, and the fruit had fallen just as badly from those. In my experiments I did not find that it burnt the leaves or the fruit for three or four days after the spray was applied. Mr. Jones here, who just came in, is the gentleman who made the application, and found that his Bellflowers that were not sprayed fell off the same as those which he had.

Mr. Klee: I will say that the arsenic was used in the same form last year with the same results. Mr. C. J. Settle, and this other gentleman I mentioned, Mr. Ousley, used white arsenic, one pound to three hundred gallons of water, and lost nearly all their fruit, except where it had been sprayed in such a way that none fell on the tree; but Mr. Settle lost nearly all his fruit and concluded from those experiments that it would not do to use any white arsenic, at least in the way he had used it; and the little experiment that was suggested at the University was done with a much weaker solution and did not do any harm to the trees, but I think Mr. Wickson shows that it is the part used with London purple that the good results have come from. As regards the Bellflower shedding, of course I would not be perfectly satisfied that it was from that, but I see every mark of the leaves being affected in that peculiar manner that it affected all kinds of trees more or less, but very much worse on the Bellflowers, causing the leaves to break from the fruit spurs, and, as you all know, when the leaves break from the fruit spurs once, it is generally the end of that fruit. I called attention to one tree on the outside which stands so that it receives the sun earlier and dries off earlier, and that tree on that side turned to the sun had a very fair crop; five boxes on a seven-year old tree; that was a very fair crop on only the two thirds of the tree which was exposed to the sun. I inquired of others, and Mr. Trumbull, of San Rafael, and Mr. W. W. Brier, of Centerville, who had both used it, told me that their outside trees of the Bellflower were acting the same way, but the interior were not. Of course, it might possibly be from some other cause, but the conclusion was that it was the arsenic.

Mr. Tompkins: In almost every locality the interior growth bears better than the outer growth. So far as the falling of apples, I do not think there has been a year in ten or a dozen when so many small apples have fallen, owing to the hot winds. At one of the monthly meetings of the Horticultural Society, there were a number sent down from Mr. Gillet in Nevada City, and among those were a number of codlin moth just shriveled up.

Mr. Jones, of Sonoma: As to experimenting with arsenic, in the first place, I sprayed one hundred gallons to the pound; I found that too strong for any trees I had, and I then reduced it to two hundred and sprayed every variety of trees I had on the place, and I found a great difference in the effect on the leaves; some would stand two hundred very well and some wouldn't. I had some varieties of apples that two hundred didn't touch, and one variety that one hundred and seventy didn't touch. I sprayed the Bellflower with two hundred, and left three trees; not so much to see what the effect would be on the foliage, but to see what proportion of the apple I could save from the codlin moth. I found the Bellflowers dropping very fast from both I sprayed, and almost wished I had not sprayed them; but I was glad afterwards that I had, for they fell only a few days quicker than those that were not sprayed, but the others finally fell just as bad; as to having the sun on them, I could notice no difference at all. With the Red Astrachan, I found that two hundred burnt everything it touched on that; and sprayed with two hundred and fifty and three hundred to the pound, and found that three hundred burnt the leaves just as badly as two hundred. I sprayed what we call with us the Winter Bellflower, and it hardly left me an apple at two hundred; I sprayed my cherry trees, just to see what effect it would have on the foliage, at two hundred, and you could not see that it had hurt them at all; that is, the Black Tartarian; I put it on the French prune at the rate of two hundred and fifty, and it killed every leaf it touched. That is my experience with white arsenic.

Mr. Smith, of San Rafael: There was a very interesting experiment tried in San Mateo County, about twenty-eight or twenty-nine miles south of San Francisco. An orchard had been planted there in 1859 or 1860, largely of peaches and pears; and about four years ago it was so badly affected by the codlin moth as to be practically worthless, and the owner turned into the orchard his sheep, and found the following year that the percentage of the codlin moth was very much less; and he still turned in his sheep, marketing some fruit the second year, and found that the codlin moth troubled him so little, that he netted quite a considerable sum from both pears and apples. Some of his neighbors have been trying the same experiment, although I don't know what the result has been. He supposed that the reason of the improvement was, that the grub was killed in the process of digestion, as all the apples were greedily eaten by the sheep.

HYDROCYANIC ACID GAS TREATMENT.

Essay by A. **Scott Chapman**, San Gabriel.

At a meeting of fruit growers called at Los Angeles on October 18, 1887, Mr. D. W. Coquillet, assistant entomologist, reported that he had improved on the Morse system of fumigation, in that he had done away with the use of carbonate of soda, and in its place dried the gas by passing it through sulphuric acid. When thus dried, he reports that he can use it at all times of the day without any injury to the foliage, and at the same time kill all insect life.

Acting upon this new idea, I treated two trees that were wet with fog for twenty minutes each with pure hydrocyanic acid without any carbonic acid. The trees were almost entirely defoliated. I again treated some twenty trees, averaging seventeen feet in diameter, in the cool of the evening, without in the least injuring fruit or foliage. I reported these facts to Professor Hilgard, who said that now the action of the carbonic acid became plain, for being in excess was first absorbed by the water to the exclusion of the cyanide.

The time required to treat any tree remains the same. The amount of material used depends entirely upon its size. Thus the cost of treating a tree ten feet in diameter is for material used about 25 cents. For a tree twenty feet in diameter it is about $1 80. While this may appear high, it must be remembered that it is the effective killing of all the insects, their eggs and larvæ.

For further particulars I refer you to Bulletin No. 73, Agricultural Experiment Station, University of California, found in our biennial report on page 390.

MR. HATCH: I would like to ask Mr. Chapman if he considers practicable a remedy that would cost $1 80 to fumigate a tree twenty feet in diameter?

MR. CHAPMAN: Well, a tree that is twenty feet in diameter is an exceedingly large tree, and, if well taken care of, would produce at least ten boxes of oranges per annum. It will cost you $1 80 to kill every insect on that tree, and if you could prevent the insects from coming there again it would pay you at that price.

MR. LELONG: How high would the tree be?

MR. CHAPMAN: That would be a tree thirty feet high; that is a very large tree.

MR. BLOCK: How do you apply?

MR. CHAPMAN: We generate the gas in a receiver and we place a tent over the tree; we have a framework that we place over the tree and the tent is wound up on a drum, and then the tent is placed over the tree, and the gas generated on the outside is pumped into the tent and left there twenty minutes, and at the end of the twenty minutes we wind the tent up on the drum and go to the next tree. It is arranged so that a couple of men could work about four tents.

A DELEGATE: Does the estimate of $1 80 cover all expenses?

MR. CHAPMAN: No, sir; that is the chemicals alone, and it would cost you, with three men, about 25 cents a tree running one tent, for if you work ten hours you could not treat more than twenty-two or twenty-three trees.

A DELEGATE: Do you find the insect on the leaves; and does it derive its sustenance from them?

MR. CHAPMAN: I have seen it all over; I have seen it in its younger state on the leaf, not in its old stage. I am inclined to think that it does not derive nourishment from the leaf. I am inclined to think that it grows on the under side of the leaf when quite young, and I am not positive about that.

MR. GLADDEN: The reason why I am so inquisitive, is the reason that I have had such good success in the use of Paris green on other insects that

I am inclined to try it for everything. I have observed those insects running up and down the tree when they become large; they attach themselves to the small stems, and even to the trunk, and there they will stay until all those eggs hatch out; the insect then falls off the trees; the little insects go up and down the tree all the time; the smaller they are, the more active.

MR. A. T. HATCH: The cottony cushion scale is a matter of serious importance to us. There is one thing sure, eternal vigilance is the price of good fruit in California, at least, and a united effort will do great good with any specific practical remedy that can be applied. There has been action taken in times past, which, if utilized as best it might have been, we would not have this discussion here, for then the cottony cushion scale would not have been considered a matter of any importance. Quarantine laws on this matter that were passed at one time, were by selfish fruit growers destroyed, because they did not happen to be technically constituted. Now it stands us in hand each and every one to do his utmost with the best knowledge he can obtain of the remedies that are suggested, and in that way we can discourage if not annihilate these insect pests; certainly, this action is necessary; every fruit grower should inspect his orchard himself, and there should be those who are more capable to investigate, to show those that do not know; very few are well versed in this matter; there are many that walk past the insects in their orchard and do not know what it is, and do not appreciate the damage it will do. For instance, there was a gentleman at Sacramento with some beautiful pears with little red spots upon them, and he showed them to the committee who were passing upon fruits, and how beautiful they were and so forth; and when told that they were the San José scale, he expressed his surprise.

MR. MCDONALD: I would like to ask while we are on this question, about the acacia tree being a producer of the cottony cushion scale. Here it is one of our chief ornamental trees. It is really a thing of beauty with us and the acacia is somewhat sacred to a great many people, and we would like to know if it is the opinion of the Convention if it is dangerous to grow that tree; if it does breed the scale then they must go; some say they do, and others they do not, and I would like to get the opinion of the Convention on the subject.

MR. ABBOT KINNEY, of Pasadena: In regard to the question of Colonel McDonald in regard to the acacia tree I can answer from my own experience. I live in Los Angeles County where the white scale is a very serious pest. On my place I have a number of acacia trees planted for ornament. My neighbors on either side of me have the white scale. I have found a little of it in my own orchard and keep it down, but on the acacia trees I have as yet never found any of the scale at all. In other words, as far as my experience goes there is nothing particular about the acacia tree that attracts the insect any more than an orange tree. I think, however, that the acacia trees, through some construction of the bark, are more subject than most ornamental trees are to the insect pests, but so far as the white scale is concerned I never observed any particular taste that that insect has for that particular tree.

MR. GLADDEN: When Mr. McDonald asked the question I almost expected the whole Convention to rise up and answer in the affirmative. I find, with my experience, that it chooses the acacia tree first, the locust second, and in one locality near the river bridge at Healdsburg, there were seven or eight very large acacia trees on which the scale was so bad that, as the gentleman remarked, the droppings became disagreeable. Finally they were cut down. They got from those acacia trees on to every other near tree, even to the willows along the river, and on the currant bushes and grapevines, and pear trees, but I looked very closely at some peach trees and nectarine trees near those bushes, and not one bug could I find on them; but they have spread around there, and the people of that place have concluded that the acacia is the home of the bug, and they have destroyed very nearly all in the place. Now they are trying to destroy the bug by cutting off the branches of the locust trees along the street—they cut them back to the stubs and then burn them, but there is still the insect, and every year on the new branches they make their appearance again in large numbers. It is so this fall. I am not aware that it has spread throughout the country. We find that it infests walnut trees, and in the neighborhood of the acacias, where they were very abundant, even this wood—known as laurel, or pepper wood—was covered with them, and there are some olive trees in close proximity to the trees badly infested with this cottony cushion scale, and I have looked at them, and I have seen none on them; but the people up in that county seem to think that wherever there is an acacia tree there is great danger.

Mr. Klee: The experience of these different gentlemen as regards the scale insects has been mine; in fact, I know that there has been thousands of acacia trees cut down; one gentleman alone has cut down two thousand trees of his own planting. As there exists over two hundred and thirty species of acacia trees I would ask Mr. Kinney if he knows the exact name of those acacia trees, as there might possibly be some preference.

Mr. Kinney: The two I had were the Acacia de Currens and the Acacia Molissima; one of them is represented as having a bark containing a large proportion of tannin, but I would like to be thoroughly understood on that proposition; I think that where ornamental trees once become infested with any dangerous insect, particularly one so dangerous and so easily spread as the white cottony cushion scale, that it is impossible for us to hope that any treatment would ever eradicate it from trees on public streets, and that therefore a tree once infested with that class of insects there is only one thing to do with it and that is to cut it down; but I do not think that where handsome ornamental trees that are entirely free from it, you would be warranted in cutting them down because they might be infested afterwards. Another reason, perhaps, why the acacia tree has been so frequently found to be affected in the northern part of the State is that it was originally distributed on them, that in the nursery in which the trees were grown it was distributed just as we have got it in Los Angeles County on the orange tree.

Mr. McDonald: It is true that there has been a great many trees cut down that need not have been cut down, and probably because we got into our minds an idea that certain things existed, that did not exist. Now, I do not want to condemn this most beautiful acacia tree, unless it is absolutely necessary. It is a beautiful tree, especially the finer varieties, the one in which the leaf is so fine and spray like. In my own experience I have been paying some attention to it. I heard some years ago that it was almost the originator of some of those insects, and as on my own place I have two or three varieties I have noticed it, and never yet have I had to spray one of those trees, but to the contrary I have found the scale on the other fancy flowers existed and we had to resort to spraying to kill them off.

Mr. Gladden: The cottony cushion?

Mr. McDonald: Not the cottony cushion, but the San José scale. I have never found the cottony cushion scale, or any other scale on this tree.

The President read a letter from Mr. R. B. Blowers, of Woodland, addressed to the Secretary, announcing that he was compelled to decline as a member the appointment to the State Board of Horticulture.

MR. HATCH: Mr. President, I desire to offer this resolution [reads]:

Resolved, That we, the fruit growers of California, in Convention assembled, recommend to the Governor the name of Mr. Sol. Runyon,* of Courtland, for appointment to fill the vacancy, made by the declination of Mr. Blowers, on State Board of Horticulture.

Resolution adopted.

MR. HATCH: The California State Board of Trade sends by me greeting with the hope for the successful working of the Convention in behalf of the State of California and the fruit growers in particular.

On motion of Mr. Lelong, it was ordered that thanks be returned to the State Board of Trade for coöperating with the State Board of Horticulture, procuring attendance on the Convention.

Recess till two o'clock.

AFTERNOON SESSION.

On motion, it was ordered that the Chair appoint a committee of four to act with himself as a Committee on Legislation.

THE PRESIDENT announced the following names to act as such committee: L. W. Buck, Vacaville; C. H. Dwinelle, Fulton; S. J. Stabler, Yuba City; G. N. Whittaker, Sonoma.

The Chairman announced that the subject under discussion this morning, "Insect Pests and Their Extermination," would be further considered during the present session.

PROF. DWINELLE: I would make a few remarks to encourage those who are inclined to fight for their orchards. In regard to the San José scale, which we all feared so much a few years ago, I have had the most perfect success with fighting it the last year in this county and I believe there is no cause for any one to be discouraged on account of that pest now. An orchard planted a few miles from this place some six or eight years ago unfortunately had the San José scale attack it, and it was not discovered until that insect had made such progress that the orchard was seriously infected. Various attempts were made, first in a small way, then on a larger scale, sometimes under very discouraging circumstances; finally, as far I can judge, with absolutely complete success. The remedy which seems to predominate is the one recommended by the State Board, I believe, and the Inspector of Fruit Pests: One half pound of commercial potash, one half pound of caustic soda, five quarts of water. With the proper proportion, the proper application at the right time, it will not injure the tree and will kill the insects. In the first place, it must be thoroughly dissolved, in the next place it must be thoroughly mixed with water and kept mixed, and then it must be applied to the trees when they are dormant.

Another remedy that has been used is one that has been recommended here: Whale-oil soap, ten pounds; American concentrated lye, one pound; water, fifteen gallons. I wish to say that this should be applied about the time the young insect is seen to move, which in most cases is about the time cherries turn color.

MR. CADWELL, of Petaluma: I have had something to do, not with so many kinds of washes, but with one kind. I don't know but what there are many just as good, but I will give you my experience in Petaluma: I have used it for three years and very successfully. I have abandoned spraying my trees in a dormant state. I commence spraying soon after the trees go out of bloom. I go to the soap makers there in Petaluma and get the soap and make the solution. I make it very strong. I dip a limb of the tree in it and then I reduce it some two or three times, dipping in a limb each time. The next day I come around and I can tell what strength to make it. Then I go to work and prepare my wash and generally put it on warm, and I will venture to say you can't find a scale in my orchard to-day, or a red spider, or anything of the kind. This wash is put on thick enough to leave a coating and is put on before the insect hatches out. I used to try to kill the old ones; now I am after the little ones. This wash remains on the tree a long time. It may be that I am in a favored locality. We have considerable fogs in our section, and even if it cracks, the moisture during the night runs it together again, so that it lasts longer than it would in the very dry counties. The eggs deposited on this soap won't hatch. I am satisfied that in washing my trees once a year, that is in the spring, it generally catches all the young insects—everything, lady bugs, or anything. The woolly aphis, of course it is pretty hard to catch all of those, because they originate in the ground, but we keep them in check. I have heard of a good many remedies that may be just as good as this remedy, but the coating over of the tree struck me very forcibly in the first instance that it would be very difficult for those insects to breed when they had to live upon that when they are very young. The last year was a very bad season for the codlin moth in our section and I succeeded, by attending strictly to the bands and washing my trees in this way, in saving two thirds of my fruit, and I don't think there was another man in the county that did as well. My fruit is without any moth, that is, free from the moth this year, so that I am pretty well satisfied with my way of doing it. It may not answer in other places and that is what we have got to look to in satisfying ourselves. Now in putting this wash on I do not go to town, and say to my Chinaman, go and put this on. I do not say to my hired man, do it before I come back. I go myself and prepare it. I get my men and go right with them, and I put it where it should be, and there lies the success of all your washing.

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* Commissioned by the Governor.

A Delegate: What kind of soap is it?

Mr. Cadwell: Nothing more than Petaluma soap, and what the ingredients are I don't know.

Mr. Block: At what time did you apply it?

Mr. Cadwell: I applied it shortly after they were in bloom. On a portion of the orchard the Rhode Island Greenings would be as large as the end of my finger while the others were just out of bloom. I commenced on the portion of that orchard where the trees were out of bloom and the fruit very small.

A Delegate: I have used the wash Mr. Cadwell speaks of. I recommend it, but I do not know the ingredients; I think there is a good deal of sulphur in it, and carbolic acid. When you go to the can to smell it it is terrible; it is the strongest smelling insecticide I ever had; the sulphur seems to be more thoroughly incorporated with the soap than in any insecticide that I have ever seen. I think that it is called the Petaluma carbolic wash.

Mr. DeLong: I understood Mr. Cadwell to say that by putting the soap on the tree it had the effect that when the eggs of the codlin moth were on the tree that they didn't hatch, is that correct?

Mr. Cadwell: That is correct.

Mr. DeLong: Do I understand you that a codlin moth lays an egg on the tree?

Mr. Cadwell: On the apple.

Mr. DeLong: I thought you said that you applied this to the body of the tree?

Mr. Cadwell: I spray my trees about the last of May. I wet them all over, foliage and everything; there is not a particle but what is wet.

Mr. Klee: I think that it is substantially the same remedy that I have used as a summer wash, from whale-oil soap and sulphide of soda. It comes very near it, only leaving out the carbolic acid. As I say in my essay, I am very favorably impressed with it.

Mr. Cadwell: The ingredients in it are caustic soda, concentrated lye, grease or whale oil, or whatever you may term it, no matter what you use—whether whale oil or grease, sulphur, carbolic acid, and tobacco—it is very easily made.

Mr. Sol. Runyon, Courtland: Mr. President, I have tried pretty much everything, and I have come down simply to a soap, and I have almost made up my mind not to wash while the trees are dormant. I use simply a soap made of caustic soda and potash. What is successful at one season of the year I am satisfied won't do at another. I went to work something over a year ago with an orchard that I have, and marked the trees so I could tell exactly and wouldn't guess any more. I sprayed some of the trees on the sixth of last November with a remedy that I got from Mr. Lelong, now our Secretary. I picked the worst trees that I could find, and went and sprayed those trees, and apparently killed every scale on them—that is, every scale that it touched. I washed my entire orchard pretty much with that wash, and I found a great difference in the time of applying it. I used the same solution right along, and when I got further in the middle of winter it did not kill nearly all the scales; it killed a great portion of them—not all. I sprayed right along, having a large orchard, until spring; sprayed my peach trees; when they began to blossom out, I quit on them. I didn't quite get through, but went on to the apple and plum, which were later. We had a very warm spell of weather in February; after that it seemed to do better work again; it seemed to kill everything at that season of the year; it seemed as if the sun had something to do with it. The recipe is as follows:

Ingredients for one hundred gallons of solution: Two gallons of fish oil, ten pounds of caustic soda, 98 per cent (dissolved in five gallons of water); five pounds of bluestone.

First—Dissolve the soda and bluestone together in five gallons of water. When dissolved, add the fish oil, and stir until it reaches a boiling point; it can then be reduced with water, and applied, but better results are obtained where it is set aside and not used until the following day; it must be applied warm.

That is an excellent wash to do the work. Another thing: I think that a great many people are working in the dark, for they wash and spray right along. We had a dry north wind, and where I sprayed, with those dry north winds, it killed nearly all the fruit buds on my pear trees; but if the wind was in any other direction, it didn't seem to affect them at all. Then this spring, as soon as I could get around to it, I commenced spraying with the following summer wash, that he gave me also:

Ingredients for one barrel of fifty (measure) gallons. Weight, about four hundred and fifty to five hundred pounds.

Ten pounds caustic soda, 98 per cent; ten pounds potash; forty pounds tallow; forty pounds rosin.

First—Dissolve the potash and soda in ten gallons of water. When dissolved, place the whole amount in the barrel to be used.

Second—Dissolve the tallow and rosin together. When dissolved, add the same to the potash and soda in the barrel, and stir well for five minutes or so. Leave standing for about two hours; then fill up with water, stirring well as every bucket of water goes in. Use the following day, one pound to the gallon of water; apply warm.

I sprayed my pear trees with the above soap; it seemed to have an excellent effect and killed all the scale—there are very few scale on the trees to-day. Then I commenced again in September and sprayed again with the same soap and the same strength, and it seemed to me that it did not kill the scale where it had in the spring. We have to notice all these things, and it is a pretty hard matter what to do and when to do it, unless we keep practicing. I believe we can keep them down. I do not believe I have one scale where I had a hundred a year ago; still, unfortunately, I have some yet. Both of these soaps must be applied quite warm, and you cannot apply them unless they are warm. But there is another one that is applied cold, and hardly any fire is required to make it. We call it lime soap, which is found on page 377 of the biennial report. The wash known as the Woodberry wash has been used pretty much along the river; I have not used it myself, and is, perhaps, the only thing that I have not used. This wash was gotten up by Mr. Green—some call it the Green wash—seems to do very good work where it is properly applied. I do not like it myself; it contains petroleum (coal oil) which makes it very difficult to mix right; those washes I have spoken of are easy to make. I am satisfied that this soap is best to be used in the summer, and I think it will be the best remedy we can use. Tree growers should make their own soap; there is always plenty of water on the ranch, and that is the most the soap contains anyhow. You have only to buy a few ingredients and make your own soap.

Mr. Buck: There is another fruit pest that I have not heard mentioned, and that is the peach moth. It has assumed very large proportions in this section of the State, and has done a large amount of damage this year, especially in some localities and with some varieties. The moth does not always work its way through to the pit, but wherever the peach is touched by one of those moths it will rot before it reaches its destination. Now, this year there has been a very large amount of peaches shipped East, probably ten times the amount there has ever been shipped before. They have carried in generally very good condition, with the exception of those that had the moth in and that necessitated the repacking the most of the lots of peaches that were sent East. I have never seen anything that was given as a remedy for that moth. It is a moth that attacks the tree early in the spring, and is worse in early peaches than in later ones. It generally attacks the earliest variety—the first of those that ripen. I would like to call Mr. Klee's attention to that, and ask him for his advice.

Mr. Klee: I have been under the impression that the peach moth had been less destructive this season than last year, and I am sorry that I have made a mistake.

Mr. Buck: I would state that my judgment is that all the moths have been less troublesome this year than last. They have worked less from some cause. The codlin moth was not near as troublesome as it was last year and that may be true of the peach moth, still there were some varieties of the earlier peaches that were boxed and sent East and I believe that one half had the moth in them.

Mr. Klee: The peach moth has been known in the State for quite a number of years and it is spreading all the time. It is one that needs close attention by the peach grower, and if we could get people to drop the return box system that would be a great point gained. It is certainly bound to spread gradually from place to place under the return box system. As regards remedies for it, I have found that on the Sacramento River, since spraying with washes has become quite the thing there, and since it has been done pretty thoroughly, there has been a great falling off. The insect works on the tree too, and seems to penetrate the young, growing shoot in the spring of the year. Washes seem to prevent them from entering it, and it is the second brood that enters the fruit; and hence if you are destroying the first you are cutting short the next. That is the only remedy that I know of.

MR. WOOLSEY: What is the best wash for it?

MR. KLEE: The soap wash as a general thing in the winter time, and then very early in the spring any kind of a good summer wash. It don't seem to make very much difference as long as it is a wash and applied properly. The history of this insect has not been worked out thoroughly, and it is one that wants to be given more attention. In the Eastern States and in Europe this same insect is said to infest the strawberry, and I thought at one time that it probably had been brought by strawberries here, but I am not aware that it ever has been found in the strawberries.

MR. TOMPKINS: There is another thing that makes a good deal of trouble in our apricot, you first find it in the spring rolled up in the leaf; it is about fifty per cent larger than the codlin moth, somewhat of the same general color with a slight reddish tinge and brown head. It works into the apricot in the same way, that is, it leaves very much the same trace that the codlin moth does in the apple, and at the end of the season they roll up in a leaf and fall to the ground. You find a great many nearly a quarter of an inch in diameter; they appear to pass the winter in the ground and in the spring appear again.

A DELEGATE: I would like to ask Mr. Klee if he knows that the peach moth will enter any other fruit?

MR. KLEE: It will be found in the plum and apricot. I have never been able to get a mature moth of the kind Mr. Tompkins speaks of, and I really do not know what it is. I saw it last year.

MR. WOOLSEY: I have found that same thing, identical I think with the peach moth in the prune, working in the same way precisely, going in at the point of the young growth. I suppose it is the same thing.

MR. BLOCK: I found it for the first time this year in the peaches, and I have no return boxes. This is the first time that I have noticed it. They act somewhat like the twig borer. I will tell you what I have done with the twig borer, and it might give you some opportunity to experiment and find a better remedy. Two years ago I was bothered a good deal by the twig borer in the plum and pear and I went and took a small oil can—that is, one that is used for a sewing machine—and put in some coal oil and put in a drop. That was done very quickly and very inexpensively, and it would kill the borer. Now I think if the same thing were to be tried on this peach moth, that we could exterminate him. I have destroyed them where I had a large tree, and it cost but very little. I started out with two men and in a day and a half covered a large space of ground, where nearly every tree was infected and I have had no further trouble—that is with the twig borer. I think it would take a little extra trouble to exterminate them.

A DELEGATE: There is one other thing which is a very great trouble. I don't know how to get at it. It is a small, spotted diabrotica (*Diabrotica vitata*). We do not know anything about it in its dormant state. It is a very gross feeder, and for that reason when it attacks young trees it is very easy to kill them with Paris green; but when it attacks the ripe fruit, commencing on the apricot, just as the fruit is commencing to get a little soft, and eating into the fruit, then it is impossible to kill them. The only thing that is to be done is to drive them away, and so some of the orchardists last summer in Suisun Valley were making fires all over the orchards;

making smoke to drive them away. They might be temporarily effectual, perhaps, but not very satisfactory. I do not know whether Mr. Klee has discovered anything more about its habits, but I have never seen anybody that knows how to get at it in the winter time or where it hybernates.

Mr. Hatch: I think that we find the larvæ sometimes on the fences, and something that occurred a year ago this summer convinced me that stubble fields were good places to find them in. There was a stubble field on one side of some apricot trees that I had and there they worked the most, and very successfully to them and harmful to me. The trees were large and full of apricots and from which I received no revenue on account of them. The stubble fields and corn fields I think are good places for them to propagate in, as where my fruit trees were adjacent to them they were attacked the most.

A Delegate: For that reason it might be well to plant them in the orchard and then spray the vegetable crop with Paris green.

Mr. Hatch: I believe that if you plant such things in the orchards there is liable to be more on the peaches and still more on the squashes and corn.

Mr. Klee: I regret to say that I know nothing more about this than when I wrote a little about it in the last report. A friend of mine has also tried to find out what has become of this insect and where the larvæ is, and we have both been unsuccessful. Last season I penned up the larvæ of these insects in a box, with wire screen over them. They laid there two months and then disappeared under the top of the ground. In the spring time I naturally looked for some diabroticas in this box, for there was no way for them to escape, but nothing appeared; consequently I am certain that I did not get them in the right condition. They don't seem to thrive in confinement and I despair a little about succeeding. My idea was where they lay the eggs that we might dress the ground with something like a slight dressing of gas lime, which proved very effective in killing the grubs in the ground. The trouble is with the insect that wherever it is it will be found all over the place; it is everywhere. There is a great difference in the different localities. On sandy bottoms it is very bad and the man will tell you that it is the worst thing that comes to the place, that there is nothing like it, and then you travel for three or four miles further and there is nothing heard of it. One thing certain, very few of them remain alive in the winter season. I saw one orchard that was sprayed with water during the season and then the tree had been shaken and the insects fell in large quantities on the ground and were burnt up, but that is altogether too expensive. It is a matter that requires more investigation. Smoke sometimes drives them away. Some people have told me that they have been very successful in driving them away by smoke, and others find by experience that they come right back again.

Mr. DeLong: Several years ago Mr. Cooke made a visit to my place, and in going through the orchards we noticed on the ground several of these spotted diabrotica and his attention was attracted to it; he got down on his knees and says let us investigate this a little, and he commenced digging in the ground; and he became convinced at the time from the little shells that he found, that they had hatched; and after digging a little further, he came in contact with one that was just about coming up, and, by a little assistance, it broke from its casing and made its appearance; and I know that at that time he was perfectly satisfied that these things hatched in the ground. I never had any idea that he thought they ever hatched in the boxes or on the trees; it was more like the saw-fly of the pear tree; and the cases they were in resembled those very much, although those were nearly white, while these were more of a dark brown. He said that he knew of no good way to eradicate them; after they were once loose they would have to grin and bear. I have a piece of marsh land on which I have Australian rye grass and some little alfalfa mixed, and last year I went out on the marsh and it was literally alive with them. I am satisfied they will feed on green substance until the fruit is ripe, and when the fruit is ripe, I don't think that is any temptation, that they prefer the fruit to anything else. I would like to ask if there is any one here who has had any experience with the woolly aphis on apple trees, and if so, after the woolly aphis has gone to the root of the trees, what their treatment is for it, and whether the tree ever dies from its effect.

Mr. Wickson: Before they take up the woolly aphis, I would like to make this remark: that what Mr. DeLong has mentioned as the finding of that insect is exactly what we would expect, because the nearest relative to that twelve-spotted diabrotica is the striped cucumber bug, which is also a diabrotica, belongs to the same genus, and on that account it is believed that is the place to find the larvæ of the twelve-spotted diabrotica. The State Entomologists of New York recommend for the twelve-spotted diabrotica a spray of one ounce of saltpetre to the gallon of water. It would have to be determined by experiment whether saltpetre can be applied to fruit trees.

Mr. Hatch: I wanted to ask if there was any one here who has had any experience with their pear trees growing slowly, the young trees, and then the ends of the twigs die, the ends or the tips of the tree dying back, and, if so, if they know any remedy for it. There was a gentleman, whose orchard I was through the other day, showed me something of that kind that I had not seen before, and I wanted to bring it here for your consideration.

Mr. Gray: I wanted to speak of that very subject. A young pear orchard at Chico has been affected to quite an extent this year: I noticed it first during the hot weather we had in June; it acts very much like the blight of the pear in the Eastern States that began about twelve years ago now, and during the four years since that time that I was in New York a great many orchards were entirely ruined; the only remedy for it was cutting off of the dead limbs, and some of the finest orchards in Central New York were cut in that way until there was nothing left. The question is whether it is the pear blight. It acts something like it on one limb on one side of the tree, and another on the other side of the tree, and sometimes skipping some trees in a row.

Mr. Shaw: I had one pear tree a few years ago that was affected that way and found the butt of the tree was literally bored full of holes and a little black beetle in those holes, which were not bigger than pinholes.

Mr. G. N. Whittaker: Last fall I applied fresh slacked lime on my apple trees for the woolly aphis with very good results, using about a peck to a tree, say twelve to fifteen years old, leaving a small amount of soil between the lime and the tree. I dug a trench big enough to contain all the lime and then threw the dirt back over the lime and covered it up entirely. This I done last fall about the time the rains began, and I think that I done it with very good success, for this year I have not near the amount of woolly aphis that I usually had, and a great many trees have not any. My opinion is that the woolly aphis will eventually kill the tree if there is not the right treatment. I have a few trees in one corner of my orchard where it first appeared, and I knew nothing about it at the time that it appeared. I believe that it was on the roots several years before it made its appearance on the foliage, from the fact that I dug those trees up, and the roots were in all manner of shapes; they were deformed, and great knots and lumps on them, and I dug up and destroyed some ten or a dozen, and doctored the other trees as I have stated.

A DELEGATE: Does it originate on the root?

MR. DELONG: I think so. I think the wood is softer, and can be got at better by them; the lime acts as a fertilizer, too, as well as a remedy.

MR. GRAY: I think ashes would do just as well as lime. I have seen the woolly aphis very much reduced; I don't know that it could ever be exterminated. I don't think that the woolly aphis will ever kill an apple tree. I think that it will stand a generation with the woolly aphis on the tree; it will do damage all the time, but the roots seem to be extending out, and I think that it will live a long time but may not bear much fruit; but, by continually putting ashes on the tree, and not very strong ashes either, they do not come up through the ashes to the top of the tree, and I think that by keeping them down they are diminished, and by using a little coal oil with a small brush or swab around where you see the most of them above the ground two or three times during the season, a great many of them would be killed. I know that we have not one, where we had a thousand three years ago.

MR. RUNYON: I would have to differ with my friend from Chico about its not killing the tree, for I have had quite a different experience from that; I am satisfied that it killed about two hundred trees for me, a portion of which were quite dead and the balance I dug up; and this was on land that was as good as there is in the State; they had been on them for some eight or ten years. It will affect the Astrachan apple the least of any I had, and I had the Baldwin and Bellflower; the Pearmain it didn't affect much. I have had a few pear trees on my place that acted as the gentleman's. They have been dying out for some three or four years. I am satisfied on my place of the cause, from the land they are on. Along the Sacramento River we have spots quite strong with alkali—we have spots about the size of this room so strong that nothing will grow, and perhaps within a rod from that there will not be any. I have come to the conclusion that those trees on my place die back, because there is alkali in the soil.

MR. HATCH: I was speaking to Dr. Harkness, of the Academy of Sciences, in regard to the matter, and he thought it was not a fungus and it must be something in the soil that would cause such a result. He had no opportunity to investigate, but on general principles judged that.

MR. KLEE: In regard to the woolly aphis I have no reason to change my recommendation for using gas lime, except that people should be quite cautious about its strength, according as it has been exposed to the air and rain. I believe that lime is also good to a certain extent, but I believe that gas lime is more effective. I have tried it on many badly infested trees and they have picked up wonderfully. In regard to the woolly aphis killing a tree I think it will do it. It depends a good deal upon the soil. On a sandy, dry soil it will do it the quickest; on a rich soil it will actually hold out longer, but I believe in that case it will always cause the fruit to be smaller and smaller as it increases, naturally sapping the vitality of the tree. Hence, whether it kills it or not, the tree will gradually become to some extent useless. As regards pear trees being affected, it is something that requires personal investigation and it may require some time. If it is the pear blight it is a very serious matter, because we supposed our climate would make us free from the pear blight, and I propose this season to give it as thorough investigation as I can. I believe from general observation that a good many cases must be attributed to the management and bad selection of the soil.

Mr. Tompkins: Out of about two hundred and fifty young pear trees planted last season there was possibly a dozen planted in very heavy clay and adobe, mixed with very heavy clay subsoil, and almost every one of these died right out, first from the top and then gradually way down.

Mr. Dwinelle: I want to say in regard to the woolly aphis, that some years ago at the University, when these experiments were going on, I had occasion to meet a very intelligent gentleman, the Consul from Chili, who took great interest in agricultural matters and was considerable of an entomologist, and he told me that the woolly aphis some years before had nearly exterminated the wild apple in Chili; that the common apple had to some extent run wild in that country, and this pest swept through the country and destroyed quantities of it. In this State I have seen a great many trees that were practically worthless on account of the attacks of this insect; they were so dry and unfruitful that they had better been out than in the ground. I think, as Mr. Klee suggests, that soil must have a great deal to do with this as it has with phylloxera. We know very well that in some soils, generally the adobe and the rich ones, the vine will resist the phylloxera without any aid, whereas where the soil is thin and the hardpan near the surface the vines grow very quickly before the attack of the insect. I want to add that drainage is important. I know some experiments spoken of. Where the drainage was poor the trees were killed, but where there was better drainage to the soil the trees suffered less.

Mr. Cadwell: As to the woolly aphis, I have tried for three years to see if I could not find some mode of destroying it, and finally succeeded. I may come in conflict with Professor Dwinelle, and some other learned gentlemen, but my information was from them and from others, that they propagated and lived in the ground; that they went into the ground in the fall and in the spring came up and spread over the tree. That was my first impression. My next impression was that they laid their eggs on the trees in the fall and hatched out in the spring, and continued on the tree, both root and branch, till they destroyed the tree, or at any rate the crop. I will not tell you how many experiments I made, or in what way. I did succeed finally in finding out after they had grown to full size on the outside of the tree and commenced traveling around it. In the evening, generally of a pleasant day some time towards the last of May, they hatched out and then they start off, and the next day you will see them with small wings. They are generally the same color as the tree, and don't fly till some time after they have wings, but keep working around the tree, so that in every direction it would be covered with the aphis in bunches and in knots. In a few days they begin to fly, and turn an amber color before they lay their eggs. I have found after spraying my trees, and I supposed that spraying the trees destroyed them, is a reason that I don't have any there yet. There was a theory that they laid their eggs in the fall of the year and hatch out in the spring. I don't approve that, from the fact that in two or three days it would grow, and on every leaf you would see the woolly aphis. I am satisfied that those eggs were not laid the fall before—that was my experience in that direction.

Mr. Klee: Some years ago I tried at the University the putting of bands around the trees, and I failed to find any traveling. I concluded that they exist in two forms; probably a root form and a branch form, which exist independently of each other; I am satisfied that it is so, and at certain times they are interchangeable, which is something not unusual with that type of insects.

Mr. F. C. DeLong: Hasn't it been a general idea that this is a sort of blood louse or something of that kind, that the insect is of that nature? Certainly in touching it, if you rub it with your finger, it has a bloody appearance while it is on the tree. The theory always advanced to me has been that this is in fact a louse, and that it remains in this State on these trees after hatching out. What it is hatched from we do not know, but it is there on the tree; after remaining there a certain length of time it descends and goes on to the root, and after having once gone to the root it never returns again; and each successive season, as it appears on the tree, it simply goes on increasing and increasing. I have asked the question as to the experience of others, whether it kills trees or not. I know now of trees on my place that certainly have been there over ten years, and those that I have talked with say that they have known it there over twenty; and the tree is still bearing good crops; and I think very likely that the fruit has been from time to time growing smaller and smaller. I have had a theory that where the trees are affected in this way, the only real known remedy is by relieving those trees of the growing crops or making too much wood. Or, by cutting them back or grafting them over, it will give the whole use of the ground to a small proportion of the tree, thereby allowing the tree to regain its strength without resorting to fertilizing; and in that way I worked over trees that I know and have known all along were affected with the woolly aphis, and those trees are growing well to-day, giving fine crops; some I have worked, over four years ago this coming spring, bore some fruit this last year, and the fruit was fine and in large quantities; the trees look well and appear well. If they were held back I do not see why that is not just as well, where the fruit becomes unmerchantable, to give the tree a rest for two or three years by working them over as to resort to fertilizing. I wanted to advance that theory to see what the gentlemen here think of it. I was asked the question several years ago how to eradicate the evil, and it was advanced by some that tobacco juice would do it, others by digging a trench and putting in fresh tobacco leaves and covering them; in some instances I tried it but I do not know actual results. In answer to a question I asked Mr. Cadwell, he says that he has not seen the woolly aphis on his trees at this time of year; certainly you can see them at my place in the spring of the year, say the latter part of April and the first of May, and I can show you any quantity now. The place where they are now is on the new wood and in and about the bark, and it assumes at this time of the year a very busy appearance. On looking a little closely at the wood of the tree these little accumulations in what I call in the form of larvæ, if you touch that with the finger it will come out something like the appearance of blood. If the gentlemen can advance any theory that will show that these do not go down on the root and that they do not lay any eggs I would like them to advance it, because there must be something left there for the new crop year. If the gentlemen's theory is all right that they travel to the root and do not return, they must have left something to produce the new crop.

Mr. Cadwell: My experience is as I said before, spraying these trees in May destroys the eggs and the aphis if there is any left, and they lay the eggs on this coating of soap and they do not hatch out. Now I do not say that they do not hatch in the spring around the roots of the tree and come and fly around and deposit their eggs; that would be the presumption that that is what they do because I have not got rid of it.

Mr. White: While living in Los Angeles I had some large apple trees between the rows of oranges that were taken out, and we found that they were badly infested with the woolly aphis, and on the roots were knots as large as a man's head and a number of smaller ones. Many of them were opened to see what was inside, and they seemed to be full of cells or openings through which a bug or worm might pass. I don't remember whether we found any live bugs in those roots, but I think we did. The trees were not healthy and the fruit was not large, but I don't think that any of the trees showed any indication of approaching death. Now in my orchard in this city I have the woolly aphis, and you can find them on the trees every month in the year; I think you can see them to-day. I have rid the trees of them several times by digging close around them and applying with a sponge a little turpentine, which kills them instantly. Coal oil will do the same thing. It does not take a great while to rid a pretty large tree of the woolly aphis in that way, but in three or four weeks the woolly aphis will appear again, and hence it is not a permanent remedy. One day I had occasion to use some common furniture varnish about the house, and near the house there was an apple tree that a limb had been cut off of, and all around where the break was was a large number of woolly aphis. I took the brush fresh with the varnish and coated it over, and I believe that is over a year ago and I have never seen a woolly aphis on that particular place from that time to this. It killed them instantly, and it has been an efficient remedy thus far. How long that will continue is more than I can tell you.

MR. DWINELLE: I want to speak briefly of a remedy for the woolly aphis, which it may be desirable to use once in awhile, when that insect makes a sudden increase, as it once did in the University orchard, and every little twig looks to be three times its normal size, because it is covered with the woolly aphis; the tree does not grow and is in a very bad way. I refer simply to the remedy which Mr. Cooper has spoken of as good for the black scale on the olive; namely, tobacco water, at a strength of two or three gallons of water, and it should be at a temperature of about 130° in a barrel; furthermore, it can be applied with a nozzle, using at least as much more as the San José spray. We detached the diaphragm and simply used a wire strainer, so it kept giving considerable force to the liquid, and with that accomplished a practical cleaning of the orchard at one application. I immediately noted a very considerable difference in the foliage, general thrift, and the apples enlarged very perceptibly and filled out rapidly.

Now in regard to this so called blight of the pear: I have not seen the particular thing, but I well remember the old blight in New York; that is not necessarily an attack upon the very tips or top of the tree; it may be a top or side limb that suddenly turns black, as if you had dipped ink on it, and the bark shrivels down, and that part of the tree is ruined. The only hopeful remedy is to cut out way below any part that is damaged from the blight. I never saw any in this State that was identical with the true pear blight.

MR. HATCH: One word about the pear: From what I have heard the gentleman say, I have a formulated theory; it comes to me from this: i one place I noted, where these trees were shown me, trees around them ha grown every year and done well before, and began to show it this year the first time; my theory is that it is the soil, and in those places i stronger than it is in the surrounding ground. Those trees have g longer and the roots have reached that point, which destroys or in destroying the trees. In places I have seen trees planted th ished well for years, and until the roots touched a certain depth, and the same results had been observed for twenty years.

that trees would live for about so long until the trees had reached a certain depth and then die. It may be the same in this case.

Mr. DeLong: One thing that I would like to ask: About two years ago in making a report to the County Board, I stated the fact that there was something that assumed the form of a small beetle, yet it looked like a centipede on a small scale, that had been fighting the moths by killing the larvæ and that was better than the bands. In the latter part of the season I discovered under some of the bands that they took a notion of eating the worm. We all thought then that this was some parasite that had come along to rid us of the pest. I noticed it that year considerably; since then I have never seen one of them, and I think Mr. Hatch said that he had noticed some of them in his orchard. I would like to ask if any one has noticed the return of them. It was what I called a little black beetle with a number of legs. I supposed the reason why I have not seen it was that I had washed the trees with a strong solution immediately after I had taken the bandages off; in fact I have never seen any since.

Mr. Hatch: Before we leave this subject I would like to say that there is a tendency to close planting of the trees. When I first planted out trees I was told to plant fifteen feet apart, and put them sixteen; I found it was necessary in the course of a very few years to dig up half of them; afterwards in planting trees I put them twenty feet. I find out now that I have to dig up half of them; and I think if in planting we increase our distances, we will improve our profits and the appearance and health of our trees, which go to make up our profits; I have got them twenty-four feet and now I am going up to thirty. I think although some trees are considered as not needing so much land as others, that by planting peach trees twenty-four feet apart I get more per acre where they are the same age than I do at twenty. I know this is strange for a man to say who has trees to sell, but as I am pretty nearly sold out it won't do me any harm this season. I propose to plant a few trees this year, and I propose to plant most all varieties thirty feet apart in squares.

Adjourned until to-morrow morning at nine o'clock.

THIRD DAY'S PROCEEDINGS.

Santa Rosa, November 10, 1887.

The Convention reassembled pursuant to adjournment, President Cooper in the chair.

FRUIT PACKAGES.

Mr. Tompkins, of Alameda, read an essay on "Fruit Packages," as follows:

There has been no material change in boxes or crates this past season. As a general thing they have been made according to the sizes declared standard at the Fruit Union meeting in January, 1887. The quality has been above the average, but on account of high quotations for lumber the price has been somewhat higher than heretofore.

The weights that the different sized boxes will hold are overstated in the schedule in several instances. The weights given are supposed to be net, but they really represent the gross weight. The four-inch plum box is put down as holding twenty pounds of fruit; sixteen would be nearer the truth. The apricot and peach boxes fall short in about the same ratio, although the way in which a box is packed is an important factor in counting the loss. The cherry box comes nearer the mark than any, often holding more than the ten pounds given it by the schedule. The sides composed of two strips were little used, the main objection being the extra work in putting them on the box, although some report that the fruit carried best in boxes of this pattern.

In nailing boxes together wire nails have been largely used, and are much better than the cut nails, splitting the wood less and holding better. The price per pound is about fifty per cent more than for the common nails, but there are so many more wire nails in a pound than there are of the clumsier nails that the difference is more than made up by the better work of the wire nails.

So much for the packages. Custom and practice have shaped them somewhat as we want them. If as much could be said of the manner of packing, the fruit business would be the better for it. The average box is very badly packed; in some cases the fruit about half fills the box. Even where the box is well filled, the difference between the top and bottom fruit is something awful. Good fruit at the surface, rubbish underneath; not only in boxes packed for the local trade, but actually in the large boxes of fruit sent in loose, where it is the simplest matter in the world for a buyer to move aside the three or four respectable uppermost specimens, and lay bare the rubbish of the lower levels, which does not put him in good humor with the fruit or with the man that sends it.

A limited but painful experience in buying fruit in the San Francisco market gave the writer some idea of the importance of uniformity and honesty in packing fruit. A buyer soon finds out where he gets and where he does not get what he pays for. Of course there are times when the best of fruit will hardly pay for its boxes and freight, but at such times poor fruit is dumped, although good fruit at least does not leave a man in debt.

It is undoubtedly a hard undertaking to build up a reputation for honest work. Your men have been brought up on the other plan, and it is no small matter to get them out of their old habits. The picking season is always a rushing one, and skilled help is invariably scarce; consequently it is the easiest thing in the world for careless ways to creep in the packing house. Right here is where better and more attractive work must be done. Perseverance in well doing is as needful here as in all other walks of life.

Fruit in bright, clean boxes will almost invariably sell at an advance over fruit of the same grade put up in rough or soiled packages. Layers of paper in the top and bottom or the boxes almost entirely prevent bruising, and add greatly to the looks of the article. I am not sure but that it would pay with a fine grade of fruit to wrap each piece in the way it is done for eastern shipment. Put up in this way it will keep in good condition much longer than when packed loose, and consequently is in demand for shipping to interior points that are out of the fruit belts, and especially to points on the northern coast. Any one shipping fruit put up in this way, should, if possible, get it to the San Francisco market on the day before the Oregon steamers sail. These steamers leave two or three times a week, and frequently take large quantities of choice fruit. All the San Francisco papers give the sailing days.

It is impossible to give anything more than the most general directions for packing fruit, in an article of this sort. If you wish to see packing as a fine art, go to some point where men who understand the business are packing the eastern shipment. Watch their packers closely and try it yourself *on the spot.* Don't leave until you fully understand the wrapping and placing the fruit and can do it with reasonable neatness and speed. If you are within a day's journey of Sacramento, go and see Messrs. W. R. Strong & Co. do it. You will be well repaid for your journey.

A DELEGATE: I would like to ask Mr. Buck what variety of plums have been shipped heretofore. I see that plums sold at higher prices this year and apparently went through in better condition.

MR. BUCK: Any dark plum or any colored plum sells well in the East; and until the market is absolutely glutted they sell well all the time whether they are extremely early or even later; sometimes later in the season with the prunes the market gets so glutted that they sell cheap.

MR. GLADDEN: We have in this county a good climate and very fine soil for growing plums; but heretofore it has not been planted on account of the outlet.

MR. BUCK: The plums of Sonoma and Napa Counties I think are the finest in the State.

MR. GLADDEN: Instead of planting plums I venture to say that in the last three years there has been at least twenty-five per cent more prunes planted with the object of drying.

MR. BUCK: You need not plant additional plum trees for fear that there will not be plums enough in the State. I think if anything is overdone in this State it is plum planting to-day; but one reason that they have brought fair prices is from the fact that they were very light in some places; they do not want a light plum, they want a colored plum. I have shipped some of the finest Gage plums that I have seen this year and very few of them will sell.

MR. HATCH: I believe there are localities especially adapted to the growing of the plum a superior fruit, and in them I would plant some trees of the better shipping varieties.

MR. BUCK: I do not want to discourage any man from planting plums, but I do not want to encourage him by anything I may say to go into very extensive plum planting, because as I said before, I think there is a large acreage of plums already planted, and the prices they brought two years ago I guess would bear me out.

MR. HATCH: And probably they might have Tokay grapes, so notably fine here.

MR. BUCK: Your Tokay grapes are always fine from this county. There have been shipped from here the finest Tokay grapes that I have ever seen. I do not consider the Natoma anywhere near as fine as I have seen in Napa, Sonoma, and Santa Cruz Counties.

MR. HATCH: They are experienced in picking and packing properly in Natoma and that is the reason that they get more.

A DELEGATE: How about the peach plum if it ripens late?

MR. BUCK: There is only a few peach plum trees in the State. Around Sacramento and Marysville the peach plum shipped this year and last brought enormous prices, that is, from $2 to $4 a box of twenty pounds. It is certainly a very fine, showy plum, and I don't know why it wouldn't sell if a month later. Now what I have said about plums would not be a criterion for a man to keep him from planting plums, if he could plant a variety that would come in a little later here than they do in other places and consequently find a good market. Now from what you suggest in reference to the peach plums I think that they might be well planted here. Now, at Vacaville, the peach plum won't bear, and if a man would give me the land and the trees I would not plant a peach plum in our valley; they won't bear enough to pay for pruning. It bears well around Sacramento and bears fairly well at Marysville.

Mr. Hatch: I have got the peach plum, but I didn't buy them under that name, I bought the yellow egg and they sent me peach plums. I got twenty-eight boxes from six hundred trees.

Mr. Wagonseler: As to the peach plum in my locality, which is about fifty-five miles above here, towards the head of Russian River, I have a good many peach plums planted already, and are profitable to raise, provided we have an outlet. I had somewhat over five tons of them this year, which I dried. Last year I had more and they bore profusely, sometimes they overbear. Since I came here I learned they were good to ship, but being thirty miles from the head of the railroad, this year I dried them for market. The question comes up now whether they will be profitable when we have communication in a year or two with the East.

Mr. Buck: The prices paid for peach plums for the last several years have been from $1 to $1 50 a box, the party furnishing a box; that would be from 5 to 7½ cents a pound; that is, for the early ones. That didn't hold true later on; then even the men that bought them doubled their money.

Mr. Whittaker: This discussion in regard to plums this morning is certainly very interesting to me; it bears out the assertion that I have been making to the fruit growers of this county from year to year, that we certainly have a bright future in this county for plums and table grapes as soon as we can get an outlet for them, which we will have, perhaps, before the next season comes around. We have thousands of acres of land here, along the line of that road, that is as good grape land as there is in the county, well adapted to the growing and cultivation of the table grape, and I say that this discussion is very encouraging to me, and must be to the balance of the fruit growers in the county, and it shows me what we may depend on in the future for our fruits and fruit lands. This peach plum is something that I am not acquainted with, and I would ask if it is a good drying plum. The fruit growers in this county have had great difficulty heretofore to get to market, and when we planted out a variety of fruit we were always very careful to see that it was a good drying fruit, so that it might be sold either green or dry.

Mr. Wagonseler: So far as my experience goes it is a good drying plum. At Ukiah last year I commenced pitting the plum the nineteenth day of July. This year our season was much later and I commenced about the twenty-fifth. The peach plum was the first that I pitted. I had about a ton after it was dried this year. We dried them in the sun. The point with me was whether they were a good plum for shipping, ripening from the middle to the twenty-fifth of July, according to the season. As to grafting them on the peach root, mine are all on the peach root; they take readily in grafting, at least that is my experience.

A Delegate: On what kind of soil?

Mr. Wagonseler: First class Russian River soil—some a little gravelly, disposed to be a sandy loam, and other parts of the orchard where it is a little heavy.

Mr. Hatch: Where do your trees do best, in the heavier or lighter soil?

Mr. Wagonseler: Varying between the two; I think in the lighter. I am a mile from the river, and still I am close to the mountains, where a good deal of my land has been made from a creek long before we came to this country. I find it spotted, though it is very rich; has been overflowed land many years gone by. But I must say that the peach plum is not an early bearer; I do not think it bears as early and abundantly as many other varieties. I have peach plum trees that bear heavily there that stood there thirteen years ago, and the last two or three years they bore very heavily.

Mr. Hatch: What do you call a good crop of peach plums per tree?

Mr. Wagonseler: Oh, four hundred or five hundred pounds on a tree ten years old.

Mr. Veeder, of Grafton: I understood that the nectarine did not bring a very good price, is that on account of the condition that they arrive in?

Mr. Hatch: That is the trouble; they don't get there in the order you ship. It does not carry in good order, if so it would sell.

DRYING AND CANNING FRUIT.

Mr. Hatch: In regard to the packing of dried fruit in boxes, the fruit should not be too dry, and it should be packed so as to press the fruit; it will keep better and appear better. It gives it a larger appearance, and makes it show to the best advantage to have it pressed. That is one thing that I have noticed in the dried fruits that many parties ship, that they are loose in boxes; the prunes look about half as large as they would if they were manipulated on the surface, and it adds to the selling price oi the goods.

Mr. Hayden, of San Francisco: It has been about four or five years since last I addressed the Convention on the subject of dried fruit, at the time the session was held in San José. It is a subject that will call for a great deal of attention and discussion; a subject that must be thought of. The questions of drying fruit, what to dry, when to dry, and where to dry, are all questions to deliberate over. The old primitive method of drying fruit, that anything you could not send to the market, anything that the hogs would not eat, would do to dry, is fast passing out of existence; they have not built up the reputation of dried fruits in the State of California upon such fruits as that, but the reputation has been built upon the very best fruits that you can raise. You can raise nothing too good to dry. What you expect to gain from your dried fruit is money, and in order to get the money from the people you must give them a good article. It is not the rich man that buys the ordinary class of dried fruit, and in order to reach him and reach his pocket, you must give him something that he wants; you must give him a nice article dried in a proper manner, and then you will reach that class of trade. I have seen the dried fruit industry grow from about $1,000 a year in this whole State of California to the present day, and I presume that I can say, although I have not the exact statistics with me, that the dried fruit interest to-day in the State of California amounts to about $10,000,000, inclusive of raisins. I have bought large quantities of dried fruit this year; I have manufactured large quantities. I have a very moderate sized drier, but I am able to dispose of about twenty-five thousand pounds of green fruit every twenty-four hours, which manages to consume a considerable quantity. In the selection of your fruits to dry, you want to be careful that that fruit is thoroughly matured. You take a green peach, or a green plum, or a green apricot, and you cannot make a good dried fruit from it; the reason is that you cannot get the preservative qualities of the fruit until that fruit has thoroughly matured; when it is thoroughly matured, then it possesses saccharine matter, or grape sugar, which is a preservative quality to preserve the fruit. You take a green piece of fruit and attempt to dry it, and when it is dried it is worthless; and as an exemplification, I might say that if you take poor, miserable, green fruit that is not fit to eat, you do not enhance the quality of that fruit by drying or canning it. The amount of fruit that has been dried up to the present date in the State of California this year, to the best of my ability of computing, has been about two hundred and thirty carloads of dried apricots (that is, in this State), about three hundred and thirty-five carloads of peaches, about sixty-eight carloads of plums (apples I have paid but very little attention to; I have not attempted to find out), and about one hundred and sixty carloads of prunes; that has been about the crop of the State. And when you undertake to figure those articles up, and stop to consider that for every carload of dried peaches or dried apricots you represent about six carloads of green fruit, you find that those will aggregate almost six thousand tons of green fruit. It is an industry that you have got to pay more attention to than you have paid; you will be able to harvest your crops, you will be able to dispose of some of them for market, you will be able to ship some of them East, you will be able to sell some of them to your local canneries, but a great portion you will be obliged to dry.

Now, then, in preparing your fruit for drying, it is very simple for every man to try and make good fruit; but the difference in fruit is just the same as the difference in butter. You can find twenty or forty different ranches; out of the forty probably ten will make good butter, and ten medium butter, and twenty very poor butter. It is just the same with dried fruit, but there is no reason, if you will only take care in picking the fruit, to see that it is not bruised, why you should not make good dried fruit. A person will take up a piece of dried fruit and notice a black spot, and not know what to make of it—it either fell from the tree, or was bruised in picking or in handling, or in transmission from one place to the other—and just as soon as that fruit is bruised, just so certain oxidation commences to take place, and when it takes place that fruit will spoil; that fruit is bound to spoil, and it will be spoiled when it is dry. Now, then, if you will be careful in picking your fruit and handle your fruit properly, and when you are prepared to dry your fruit if you will submit it to a little sulphur process, in order to preserve the color, then you will be able to get a product that will be savory. There are questions, of course, pro and con, in regard to the effects of the sulphur. My experience in the matter of sulphuring fruit has been considerable, and it is because it is a thing that is not thoroughly understood. When the fruit is picked and cut with the knife, if that fruit is placed upon a tray and submitted to sulphuring for a period of twenty to twenty-five minutes, it will have this effect upon the fruit: it will prevent oxidation (oxidation is decomposition); it will prevent the fruit from decomposing before the sun, or hot air, or whatever process you make use of to dry that fruit, takes effect. It will prevent oxidation, and that is what we want.

What we want in placing our fruits in the Eastern States is to present to them a product that they will want; and what they want is a bright, palatable looking fruit, and it can be very easily made bright and palatable by this simple sulphur process. It does not injure the fruit; I am prepared to stand here and argue with any one in regard to that particular point. I will tell you why it does not injure the fruit: the action of the sulphuric air or gas, which is made by the burning of the sulphur, closes the pores of the fruit and prevents the excretion, and when that fruit is then put in the drier, or put in the sun to dry, the excretion being checked, drying commences to take place almost immediately, and hence there is no chance for decomposition. That is all the sulphur does, and at the expiration of an hour, or two, or three hours, the effects of that sulphur has entirely passed away, either by the process of heating or by the process of drying in the sun. It does not affect the fruit; it does not penetrate, only the outer coating of the fruit, hence I say that it is not injurious.

A great many apples were dried in the early days, before we understood the entire process, and the process of bleaching, as they called it, of the apples was done by placing the sulphur upon the furnaces and thereby forcing the sulphuric air or gas into the fruit as fast as the cells of the fruit were opened and the evaporation took place; then it did penetrate; but in the modern process of sulphuring, immediately after cutting with the knife, placing it in a box and sulphuring it then, and afterwards submitting it to your drier or to the sun, the effect of the sulphur has entirely passed away, and you will not injure your fruit at all. I suppose that some of the gentlemen would like to know some of the kinds of fruit that would be best to dry. I might say in regard to that, I had perhaps hundreds of peaches. I presume that one of the best drying peaches that we have had is the Muir; another very fine variety is the Salway, a very fine drier because they dry heavy, and that is one of the principal advantages in drying fruit. Apricots, the Moorpark is the best drier—that is, the heaviest drier and the most profitable; and then the Hemskirk, and we come down to the Royal. The Royal is a very good drier, unless it be from the Sacramento River; from there they don't dry very well, because they dry almost to pieces; but the Moorparks are very good, and the Vacaville Royals are very good. The Imperial apricots dry good, but along the river they are quite moist. Of the plum varieties there are a number, the Egg plum, Coes, Golden Drop, Columbia, Washington, and all those varieties; the Peach plum is a good variety.

A DELEGATE: How about clingstone peaches to dry?

MR. HAYDEN: The clingstone peach is a very good peach to dry, but a great trouble is getting the pit out.

MR. HATCH: I have had occasion this year to dry a good many clingstone peaches. We found that we could get the pits out and have more peach left than we could with the freestone of the same size.

MR. HAYDEN: I will say in that connection that it is the more profitable to dry, if you only have the patience to get the pit out; it is more profitable, the meat is firmer and possesses better qualities when the peach is all dried than other varieties. The Early Crawford is a very fine peach to eat, but a very poor drier. It will take almost seven and one half pounds of Early Crawford peaches to make one of dried.

MR. WAGONSELER: At about what stage would you dry the plum?

MR. HAYDEN: In regard to that I would use the same expression I did as regards the peach. You want to take a peach when it is mature, when it has got a good full color; the same with all kinds of fruit, they want to be full colored, but they do not want to be soft. I have been in a section this year where I have seen a hundred thousand pieces of lumber spread with peaches, and I am prepared to say that 10 per cent of them were wasted. They had gone to work and allowed their peaches to get too ripe, and the fiber was gone, and the peaches were spread right out there, and they dried as black as your hat. It is impossible to do anything with that kind of fruit, and I want to make a suggestion here. It is the old adage of penny wise and pound foolish, to endeavor to save that kind of fruit; you can't save it; it does not produce a profit to you, or to anybody else. When fruit gets too ripe, don't try to cut it, but go out and get that which is just ripe, and save that, and let that which is too ripe go, and let the hogs feed on it; but don't waste your time and waste your labor in trying to dry something that, when it is dried, will not bring you anything.

Mr. Hatch: One gentleman had a good many peaches come to the ground ripe, and he did get pretty good paying prices, better than if he had made pork of them.

Mr. Hayden: What I had reference to in overripe fruit is this: You take a peach and hold it in your hand and shake it and the skin will come right off; that is too ripe to dry. They may fall to the ground and you can pick them up and dry them, but when you take a peach where the skin is ready to drop off, it is too ripe; there is no fiber to the fruit, and when that fruit is dry it is not salable, it is not fruit that would be palatable, and what we are looking for is a product that will bring us money. I told you four or five years ago in the Convention that you could not raise dried fruit enough, that we were ready to take it all, and haven't I fulfilled that statement? Haven't we for the last few years taken all that you could give us? I am not speaking of myself individually, but of the dried fruit interest. The dried fruit interest has taken all your dried fruit, and of the last year's crop there is very little in San Francisco to-day, and about all the fruit there is in the State is there. We have placed it in the eastern market; there is where it goes to, and in order to place it there you must give them the product they want; you must give them a good article.

Mr. Tompkins: What do you consider the best temperature to dry fruit at to get the greatest weight and best fruit in the evaporator?

Mr. Hayden: My idea of the evaporator is somewhat different from the ordinary theory. The temperature to which I subject the green fruit is about 240°; I allow the fruit to remain in that temperature for a period of from twenty to thirty minutes, according to the size of the fruit, and then it is taken from there and raised up and finished at a temperature of about 135°, but for sun drying, I think that an even temperature from 100° to 115° is the best temperature for the drying of fruit in the sun. It is better than where it is too hot or where it is much colder.

Mr. Tompkins: Is the theory correct that the evaporator starting at a high temperature destroys the germs, and then to dry it at 135° or 140° it will weigh heavier than the sun-dried fruit?

Mr. Hayden: I claim it is, for this reason: After the fruit has been evaporated about 50 per cent in my drier, then I take it from my drier and put it into what I call a hot-room, where there is a temperature from about 130° to 135°. Now, what I claim by the transferring of that from the drier to the hot-room is this: that what remains in that fruit after having been transferred from the drier to the hot-room is a syrup or saccharine matter, which is a preservative quality that is crystallized into the fruit instead of being dried out of the fruit.

Mr. Tompkins: That is just exactly what I have always thought, though I have not had very much experience in the matter; that if you want to get the best product you must use the evaporators in that way, instead of letting the sun and wind dry it all out.

Mr. Hayden: That has been my experience in this business, and I am quite conversant with it. Many of the larger fruit growers in the State when they come to San Francisco come in to see me, and that is my principle of drier. I have none for sale, it is one built for my own use, and I am always pleased to see those interested in the dried fruit business. I am a manufacturer and dealer in dried fruit, and I have made it a study. There are lots of things that I don't know, and I presume there are a few things that I do know in regard to it; but I am always glad to learn more. That has been my theory with dried fruit; that after you have submitted it to a high temperature for a short length of time—for instance, when I dry apricots in four hours from the time the green apricot is put into my drier it is ready to go into my hot-room, and there it remains for fifteen to twenty-four hours, according to the size of the fruit, and then it is thoroughly done; then you can take a piece of the fruit that I dry and cut it open, or open like that, and it looks as if it were a glutinous substance, a perfect jelly—that is what I claim by my process, instead of drying out the moisture in the fruit it crystallizes that into the fruit and makes a preservative quality out of what a good many send out of the chimney.

A Delegate: You think fruit will preserve better starting at 220° than at 170°?

Mr. Hayden: I will give you my reasons. It is necessary for me to push along the business and dry as rapidly as possible, and I claim that for a period of twenty or thirty minutes in that hot air I evaporate from 10 to 12½ per cent of the evaporation. I force it, but I do not allow it to stay there long enough to destroy the fiber of the fruit, but I make quick and rapid evaporation for the first half hour, and then I gradually taper the heat off. The upper portion of my drier is only 180° when the lower portion is 240°.

Mr. Stabler: In conversation some two or three years ago with one of the most intelligent fruit growers of the State, I was informed that he, as an experiment, once went to an orchard on the lowest bottom river land in the neighborhood and got a given number of pounds of apricots and then he went to a piece of land higher and thoroughly drained, and he dried the two products and found that the proceeds were two to one in favor of the highland fruit. That seemed to me to be very remarkable, and if the gentleman has any knowledge on that subject I would like to know whether there is that much difference between fruit grown on very wet land and fruit grown on land that is dried thoroughly by underdrainage.

Mr. Hayden: The only way that I can answer that question is to say that inland fruit is more profitable for us to dry than fruit that is grown along the Sacramento River; I would sooner pay a quarter of a cent more for Vacaville apricots than I would for river, because there is that much difference in my favor.

Mr. Tompkins: How is it with Fresno and Kern?

Mr. Hayden: A very few of them come to this city. The only thing that I can speak of is that I was on a visit there; it seemed that they yielded well, and dried well, and dried very heavy.

Mr. Butler: What is your process for removing the peel of your peaches?

Mr. Hayden: I use alkali. I take from ten to fifteen pounds of peaches and put them in a wire basket and immerse them in the strong lye, boiling hot, and then I put them into cold water, and the peel comes off very readily. I keep them immersed only about half a second, just dip it down and dip it out, the same as you dip prunes exactly; then the peeling will come off. They take it off with rubber gloves.

Mr. Hatch: You leave it in there a little bit longer and then put it in cold water, and you can take it off without any hand work.

Mr. Hayden: I have been afraid the lye is too strong and would affect the meat of the peach. There is another thing that I would say in this connection. I will give you my idea: When you take that peach and put it right into sulphur, just as it is, and then you take them out and pit them, and then I have submitted them a second time to the sulphur, and in that way I prevent oxidation and keep the peach perfect, and keep its color, and it is a much better way than the old process of peeling by machinery.

A **Delegate**: After you immerse them in the lye, do you reimmerse them in hot or cold water?

Mr. Hayden: Cold water. I have four cold waters, that is, I give them four cold water baths in order to dissolve the lye.

Mr. Butler: Each immediately succeeding the other?

Mr. Hayden: Yes, sir.

A **Delegate**: What lye do you use?

Mr. Hayden: Concentrated. I use two pounds to one gallon of water.

A **Delegate**: Did you ever try boiling water alone without the alkali?

Mr. Hayden: I have tried water. It can be done.

Mr. Stabler: A gentleman said that it is better without lye.

Mr. Hayden: If we are doing it for home use it is a different thing, but where I am using such quantities it is necessary for me to be expeditious, and that is why I use such a strong lye.

Mr. Hatch: Do you get the peeling off without any handling in hot water?

Mr. Stabler: No, you have to put it in cold water.

Mr. Buck: I am much pleased with what the gentleman has said; he has touched one of the coming interests for the fruit business of this State. This is the first year that we have ever had any large quantities of good dried fruit to sell, that is, in different varieties; but this year there has been a very large amount of good fruit dried all over the State. I believe the time is not far distant when the dried fruit product, including raisins, will be the predominating interest in this State. It will produce to this State more money than any other interest in the State. We can make in this State a product of dried fruit, especially of the tree fruit, that no other section of the United States can begin to compare with it. Two years ago, while I was East, I took a good deal of pains to see and examine some of the best dried fruit that I could find from the Delaware and Maryland evaporators, and also large quantities of dried peaches shipped from the section that has in years past supplied the most of the dried peaches, which is the northern part of Georgia, North and South Carolina, and Tennessee. Those States have furnished the dried peaches for the United States for years, and they are nothing but scraps as compared with our dried peaches; in fact, they are mostly cut from four to eight pieces to the peach, and then they dry away very much more than our fruit does. I saw in only a few places what would be a fair article for California dried peaches, from Delaware or below there, and there were none of them more than half the weight that you can find in any store in California where you find peeled dried peaches for sale. Now, as has been said, we have heretofore dried our refuse, but we have now got to dry a portion of the best of our products, and in order to keep a market for that product it wants to be well sorted—as well sorted in the drying as in the shipping. If you have any poor dried fruit put it by itself and put your own individual brand on the good fruit, and I do not believe that there is an acre of good fruit land in bearing of peaches, apricots, or plums, that will not produce $100 per acre, and dry the entire product. As he has said, I believe the fruit from Vacaville will produce more pounds of dried fruit than any other section of the State. Perhaps many others are just as good, but it is one of the best for the same number of pounds per tree, and I believe that we can make our fruits worth from a cent and a half to two cents a pound at home by drying it in good shape; and I believe one of the things that all the fruit growers of the State should prepare themselves to do, instead of being forced to San Francisco, and at half a cent to a cent a pound, to prepare to dry their fruit and force the buyers to pay what I believe they can pay—about two cents a pound for the fruit.

MR. TOMPKINS: I would like to know how you keep the worm out of the dried fruit after it is evaporated?

MR. HAYDEN: I will tell you in regard to that: I have got a superheater, and I use superheated steam, which is dried steam—steam which is made and then dried—and I submit them to that for five minutes under a heat of 270°. It softens the fruit, gives me an opportunity to pack the fruit, and at the same time it kills all worms, germs, larvæ, or anything else that may possibly be there, and I guarantee the fruit will keep for any length of time, so far as the worms are concerned, unless they put it inside of the fruit.

MR. TOMPKINS: In what shape do you put it in?

MR. HAYDEN: I put it in right on the tray.

Here recess was taken until half-past one o'clock.

AFTERNOON SESSION.

MR. COOPER: By special arrangements the subject of "Forestry" comes up before the Convention the first thing this afternoon, and before bringing the matter before you I will read a few lines from my opening address: "Forest culture, in relation to fruit, also has your attention. I refer you to the very able and interesting essay by Abbot Kinney, pages 118 to 127 of the biennial report. It is a question whether fruit growing in many parts of the State can be made a success without the planting of forest trees for their protection." I believe that this theory has been admitted by all intelligent horticulturists in every part of the world: that forest trees are a necessary part of successful fruit growing. From my own experience on my own ranch, I am satisfied that I can grow better fruit and more of it, with less trouble, by having one quarter of the area in forest trees and three quarters in fruit trees than I could if the whole were in fruit trees.

OUR FORESTS.

THEIR DESTRUCTION AND ITS DANGERS.

Essay by ABBOT KINNEY, Pasadena.

The lines of beauty in a building are the lines indicating appropriateness to use; the lines of beauty in man are the lines of strength, and the lines of beauty in woman are the lines indicating reproductive power. Thus the admiration of mankind is ever directed, in a healthy society, to the useful and the necessary. Amongst Americans there is a nearly universal love for trees, thickets, and for the forest. From analogy we must infer that this love and admiration for trees is based on truth, and arises from the use and necessity of the forests to mankind. The emotional side of the forest question should therefore not be despised. Nearly every respectable person dislikes to see a tree cut down or a forest burned by the ruthless fire, but people cannot always give a reason for their sentiments. The City Park, which is an imitation of nature's glades, and the National Parks at the Yellowstone and Yosemite, which are preservations of nature for the delight of the people, are the result of this sentiment for the forest.

Our churches of Gothic architecture are intended to imitate in their pillars and arches the lines of the forest. In primitive times religion was still more friendly to the trees, for the holy places of our ancestors were the consecrated groves of the Teutons, and the Sacred Oaks of the Druids.

In education also, the woodland plays a part. The brilliant intellectual period of Greece had its schools in groves. To this day the Greek word for grove, "Academy," has come down to us as a name for a place of learning.

The emotional side of a question, however, is not enough; it is the practical that governs the world, and it is from this side that the forestry question must be approached, if permanent results are to be achieved.

The first business thought of a practical person in looking at a forest is, what are its products worth? That is, what can be made out of it? For the products of the forest enter into the life of every one. The varnish of the artist, the rubber, the gums, the resins of commerce, the barks of the tanner, the corks of the vintner, the handles of our tools, hoes, plows, etc., our dye stuffs, our wagons, the ties and cars of our railroads, fences and telegraph poles, furniture, wharves, boats, ships, and, in America, even the houses we live in, are largely the product of the forest. Few people appreciate what the annual drain on our forests is; even such small things as matches consume great amounts of lumber every year; charcoal and fuel are a great drain on our forests; even coal is but a fossilized form of wood. Nuts, fruit, and medicines, such as cocaine, quinine, etc., cannot be overlooked. When we then consider the products of the forest, it will not be a surprise to learn that they were estimated in the United States for the year 1886 at $800,000,000. The last Government statistics at my command show some of our principal crops to have been:

Wheat	$474,291,850 00
Cotton	280,266,242 00
Gold and silver	74,400,000 00
Coal	94,500,000 00
Iron ore	20,470,000 00

It will thus be seen that the economic value of our forest products is nearly double that of wheat, more than ten times that of gold and silver, and forty times that of iron ore. The census, the agricultural reports, the recorded observations of intelligent men, as well as the individual experience of every one who has by travel become acquainted with the country, show that the consumption and destruction of our forests now so far outruns their reproductive capacity, that at the present rate in a few years we will have no forests at all, and their vast crop, valued at $800,000,000 a year, must disappear from our census books. We are eating into our capital and providing for no renewal of it. It is not alone the good lumber and firewood taken that we must calculate on, but the waste that accompanies it, and the destruction annually caused by fire. These the best authorities state to be even greater than the drains of commerce.

Forest fires destroy every year millions of this the people's property, and blacken and mar the landscape. Besides, the lumbermen, in the prosecution of their business, waste fully as much timber as they use. In my visits to Mendocino County, and other centers of lumbering activity in this State, I have seen left to rot or burn large portions of the trees felled, and again and again I have seen magnificent trees felled and left untouched, because they did not fall right, or for some other trifling reason. In this way much lumber is wasted, and firewood enough is annually destroyed to supply the whole of California for years.

Besides the waste, this debris in the oft occurring fires makes an intense flame and heat, endangering all contiguous forests, and destroying, often entirely, and always much, of the wood they traverse; and also the humus in and above the earth. In this connection, it may be well to say to those having lands to clear, that it has now been demonstrated thoroughly that burning over land destroys the best part of the soil, and thus permanently injures its producing capacity. The hotter the fire, the deeper it destroys the soil. Experiments in Canada show that a hundred years of repose and forest action will often not reëstablish the strength and fertility of the soil passed over by hot fires.

Besides the regular lumbermen who operate on a large scale, there are numbers of individuals engaged in making shakes, etc., who use only selected trees, chiefly the sugar pine, which in this State reaches a great size, is very valuable, but does not readily reproduce itself. To be advantageously used, these trees must be in certain conditions, which can only be told after they are felled. Thus thousands of trees, and of the very best, are annually felled and found unsuitable, and left to rot. At the best, these men only use about twenty feet of the magnificent trees they cut, the rest being waste. The sugar pine is fast disappearing. The tanbark men also destroy great numbers of trees, taking only the bark. I have seen in this State, in one place, woodmen destroying trees, cutting off only the branches for firewood, and leaving the trunk and bark unused; in other places, lumbermen leaving the branches and firewood, and taking only the trunks; again, tanbark men leaving the entire trees, using only the bark. It may not be a crime to allow such unnecessary waste, but it is unmitigated folly to be thus throwing right and left a property that brings us in $800,000,000 a year.

The forests are also much injured by sheep and goats that are driven into them for a few weeks' pasturage; these destroy the young trees and pack the ground so that it cannot so well receive and hold moisture. Besides this the shepherds frequently deliberately set fires to open the country, or as they say, to improve the pasture, thus often destroying in one season more lumber, firewood, etc., than the value of all the sheep and goats and their products that have or ever will visit the scant mountain pastures.

Every considerable government of Europe now has its Forestry Department. Every one of them gives a net revenue. The system pursued is nearly the same in all. By it the forests are preserved and increased in area at the same time, the maximum of firewood and lumber consistent with this preservation is taken out, and no waste is allowed.

The revenues from these departments show that a large properly managed forest is a source of income.

Saxony has a net annual income of $3 25 from each acre in her total forest area. Alsace-Loraine, about the same. British India, although a new convert, and under heavy expenses, had, according to the last returns in my hands, a net income from her forest lands of over $1,000,000.

All the European Governments, save England, which is exceptionally situated, have Forest Departments served by men instructed in Forest Schools, some of which are celebrated; such as those at Hanover, Aschaffenberg, Minden, and Nancy, each department giving more or less net revenue. In Austria, Italy, and France, considerable work in forest planting, from which little or no direct revenue can be expected, is being done.

Such desolate places as the Karst in Austria and the Landes in France are thus being reclaimed. Trees are also being extensively planted on the watersheds of rivers and torrents. In the first case the object is to reëstablish regularity of flow in the streams; and in the second, by preventing the rapid delivery of heavy rains from bare surfaces, to reduce and eventually end the destructive action of torrents that at present alternate between being beds of bowlders or glittering wastes of sand, and rushing full of turbulent water charged with mountain debris, and carrying destruction in their course to the valley lands. These works of the foresters are productive to the nation, but show no revenue to their department, which is a fact that must be taken into consideration in the economic management of forests. Some of these works have even become remunerative. The fine plantations on the southwest coast of France about Arcachon, to reclaim the desolate Landes, are of these. In that section the sand dunes of the coast were rapidly advancing on the interior in hills over two hundred feet high; fields, houses, villages, and even church steeples, were entirely buried out of sight.

Major F. Bailey, R.E., in a recent trip to the Landes, speaks of his guide tying his horse to the projecting point of one of those covered church steeples.

The planting of these forests near the coast, together with the preliminary work necessary to establish their growth and stop the rolling sands, costs the French Government about $40 per acre. Tracts in these forests are now rented for five years, with the privilege of cutting selected trees, and tapping others for resin, at a price equaling about $70 per acre. It will thus be seen that under even adverse circumstances, a scientific forest management designed for protection to a country, rather than for a direct profit, may be made remunerative.

In California a number of small tree plantations have been made, and I believe with very satisfactory results. Several small groves of locust trees have been reported as having proved profitable, the wood being sold for wagons, etc. The only figures I am able to give, however, apply to plantations of the Eucalyptus globulus. One case is that of Mr. Robert C. E. Stearns, of Berkeley, who reports on a plantation of General Stratton, made in 1869, twenty acres were cut when eleven years old, every item of expense was noted, and a rental of $5 per year was charged for the land. The net returns on the twenty acres were $3,866. Another case is that of Mr. George A. Nadeau, of Los Angeles. His figures are:

Cost of trees at time of setting, per acre	$7 50
Labor of replanting, per acre	5 00
Cultivation, per acre	5 00
Rental of land for seven years at $3 per acre	21 00
Expense for seven years, total per acre	38 50
Income: Thirty-five cords of firewood per acre, at $3 per cord in the tree	105 00
The totals finally footed show total expense on tract	3,734 50
Total return	10,185 00
Net profits	6,450 50

California experience shows that tree planting is profitable within reasonable periods, and gives returns as soon as some orchards, while requiring less care and less first cost.

From these points it will be clear that looking at the forest in the most common place and most narrow practical view, a scientific management of our forests is both advisable and necessary. Without this, the immense crop of the forests must disappear, to the great detriment of the country.

While these considerations would doubtless be deemed fully sufficient to a business man to warrant a change in our forest policy, looking to the preservation of the woods from waste and fire and the maintenance of their natural reproduction to replace the legitimate demand of trade, there are still other reasons of more pressing force which demand forest preservation.

These are the sanitary and climatic influence of forests, and still more their effect on the agricultural productiveness of the country through the precipitation and distribution of moisture controlled by them, and their importance in equalizing the flow of streams and in maintaining springs.

The sanitary influence of forests is well understood by investigators. It will be well, however, to give a few illustrations on this point.

The Roman Campagana in ancient times was covered with woods and groves; from it sprang one of the hardiest and most forcible races of the world. We must therefore infer that it was a healthy locality. Since the clearing of this district, and through modern times, the Campagana has been one of the most deadly miasmatic regions of Europe. Within recent years considerable plantations of trees have been made upon its desolate wastes. One of the largest of these was made upon the Colonna estate, near Civitta Vechchia. The trees were principally eucalyptus. The amelioration in the health of the locality was prompt, whereas laborers only remained on the estates in the day, and departed to safe places at night, losing much time in traversing the long distance between their work and their shelter. After the growth of the trees, they were able to remain with immunity in the district itself.

Another plantation on the Campagana was made by the priests at the grand church of St. Paul. The benefit to the health of the fathers was in this case equally marked, the malarial fevers have become less frequent and less deadly. The island of Cypress was formerly celebrated for its luxury and refinement. It contained a large population, and was at that time, at least in its mountainous parts, covered with forests. It has been cleared, and is now a desolate island of bare rocks, with a few cultivated valleys. It is subject to virulent forms of malarial disease, and contains not a hundredth part of its former population, and none of its prosperity. Since the English occupation, forest plantations have been commenced on a large scale, but it is too soon to know what their effect will be.

The shores of the Mediterranean contain numerous instances similar to these. The island of Mauritius is still another, but we do not have to leave our own country to prove this count. The records of the huntsmen and adventurers who first traveled the wooded Western States of America make no mention of malaria as a dreaded malady. The record changed when the settlers came; these cut the trees, and it was then, and only then, that malaria became the scourge to humanity that it is in parts of the Western States. While this evidence cannot be held as conclusive, still its confirmation in every day experience strengthens it. The planting even of belts of trees in malarial districts protects localities previously subject to malarial influences. It must be understood, also, in this connection, that the clearings in the Western States were a necessity, malaria or no malaria.

Many diseases common in open countries are rare or absent in wooded ones, even where considerable village population exists, as in the Black forest of Germany. The death rate in the communities of the Black forest is lower than that of any other part of Germany. Consumption is the disease which, amongst civilized nations, counts the greatest number of victims. In forests this dreadful malady is practically unknown. This fact is now so well recognized by medical men that they send their patients, even in a climate like that of central New York, to the Adirondack woods as a cure, to remain not only in summer, but in winter also.

The beneficial effects of the pine forests at Arcachon, in France, and in our Southern States, have been much availed of in phthisis.

Woods are the best of places for diseases of the eye.

Fog, it is now known by a number of well regulated experiments, is impossible without dust of some kind in the air. In this connection, it may be well to call attention to the explanation of our coast fog. In summer the upper currents of air are from the coast to the sea. These are charged with dust, which gradually drops out of them as they lose force on leaving the land. This dust falls into the sea atmosphere, which is charged with moisture, and fog is the result. Fog is irritating to those with weak or defective lungs. In forests this dust, with moisture surrounding it, is sifted out by the foliage, and fogs in forests are always modified, and if the exposure be favorable, are entirely eliminated. Fogs do not occur in dense forests.

Trees all have some odor, and many a balsamic and agreeable one. Of such trees, the pines, firs, cedars, and laurels, bay and camphor trees are the best known. The emanations from these have in general a sedative effect upon the nervous system, but a stimulating one on the vital functions. They are health-giving to the human being, and to an equal degree they are fatal to germ life, and noxious to insects. The importance of their effect will be recognized when we reflect that many diseases are caused and transmitted by germs, and that these germs are carried and spread by insects, such as flies and mosquitoes. Insects will not congregate upon pitch, camphor, myrrh, etc., and burning of these and many other tree products, as the leaves of pine or eucalyptus, stupifies and kills insects and germs. Some vegetable products, as Pyretherium, are more noted and deadly than others.

The philosophy of the attraction that pleasing odors have for man is well worthy of study. The taste or instinct for them is as useful as its complement, the dislike of bad smells which enables us to avoid infected places.

In the trees the sap mounts from the roots in a crude state, composed of water (oxygen and hydrogen) and a slight admixture of earthy salts; it is carried to the leaf, when it is elaborated by the chlorophyl, or minute grains that give the leaves their green color; when carbonic acid is absorbed from the air, and oxygen is liberated from the sap and decomposition of the carbonic acid. Carbonic acid has a debilitating effect on man, this the tree absorbs, while oxygen is man's life, and this the tree gives.

Trees, while preservative of moisture in dry situations, have a great drying power when moisture is excessive, as in swamps and malarial lands. Few persons realize what an extraordinary amount of moisture a tree is capable of evaporating into the atmosphere. The evaporation takes place through the stomates of the leaves. Of these mouths ninety thousand have been counted on the lower side of the cherry laurel leaf, which is devoid of stomates on the upper side. On the leaf of the lilac one hundred and sixty thousand have been counted. There is a great diversity in this respect among plants. The only experiment with which I am acquainted, as to what amount of evaporation can take place through leaves of trees, is that of Marshall Vaillant, quoted by J. C. Brown. He took a branch of an oak and placed it in a vase full of water. He measured the water lost through its leaves, and considered himself enabled to conclude that the tree from which this branch had been detached would be emitting into the atmosphere in twenty-four hours upwards of two thousand kilogrammes of water, equal to a little more than five thousand pounds.

The abnormal condition under which this experiment was made must cause it to be considered as only an indication of what may take place under normal conditions.

A flow of sap from wounds made in trees for commercial purposes, is another indication of this power of taking up water by vegetation. Pine trees tapped for resin, camphor trees for camphor, gum and rubber trees for rubber, show a great flow of sap, but I know of no measure having been taken of it. But measures have been taken of the flow of the sugar maple (*Acer saccharinum*), and the yellow birch (*Betula excelsa*). Emerson cites a maple six feet in diameter that yielded thirty-one and one half gallons of sap in twenty-four hours, and Marsh cites one in Warner, New Hampshire, two and one half feet in diameter, which yielded twenty gallons in eighteen hours. Dr. William cites a large birch tapped in Vermont, the flow of which was measured from time to time for four or five weeks. The sap ran at the rate of five gallons per hour, progressively diminishing. The total yield was estimated at one thousand eight hundred and ninety gallons. The flow from these trees was only from one or two auger holes, and was insufficient to immediately injure the tree.

When we consider the number of trees which thrive on a single acre, we may perceive how important their collective action may become. Trees may drain a soil in still another way. Their roots penetrate into the soil and make permeable strata that would otherwise be impervious to water. The channels made by the roots become a means by which surplus water finds its way into substrata, from which it appears later as springs in lower situations. The life activity of plants produces on the oxygen of the air a condition known as ozone. When in this condition, oxygen is opposed to germ life, and consequently to all forms of putrefaction.

From these points it can be understood why a district is healthier in forests than when it is cleared. The more complete the clearing, the more complete the change. There are other beneficial influences of trees on health, some of which are discussed under another head; such, for instance, as their electrical influences, their equalizing tendency on winds and temperature, and their maintaining effect on springs, whereby wholesome water is secured.

Forest economy is slow in its returns, a new growth of timber requiring many years, which is discouraging to the short lived man. So, also, much of forest land in new countries must be cleared as population increases, whether the result be health or sickness.

But there is a point, variable according to the climate and topography, beyond which the destruction of forests diminishes the capacity of the country to support population, and while at first increasing the arable area, in the end diminishes this through the action of torrents in washing the soil from some places and covering others with sand and bowlders, while at the same time the whole country becomes more exposed to extremes of flood and drought, and the climate more variable and unfavorable to agriculture, the winds stronger, and the springs less reliable and often extinguished.

It is by educating the people to these truths of the effects of excessive and unwise forest destruction, that we must hope to save California from the fate of Palestine, Palmyra, Baalbec, Carthage, Babylon, Greece, Spain, and, in fact, of all the early seats of man's civilization. He who, like myself, has traversed these sometime centers of human prosperity and population, now desolate wastes, the haunts of the hyena and the reptile, must feel that the time has come for this intelligent American people to follow the lead of France, Germany, Austria, and the civilized powers of the world, in averting by timely measures so great a disaster to ourselves.

I shall now briefly set forth the manner in which the beneficial effects of forests in agriculture are produced.

The normal evaporation from bare land is much in excess of that from lands in woods. An experiment made with two jars of equal size, covered with wire gauze to protect them from flies and insects; one set under a bush and the other in a place sixty feet from the surrounding trees, but thus protected from wind, showed the evaporation in the open to be more than double of that under the bush, the exact figures being bush jar, .863 evaporation; jar in the open, 1.854.

Mr. W. Blore, who made this experiment, calculated that in the one hundred and two days of average dry season at the Cape of Good Hope, the excess of the evaporation from a burned or bare district over a bush or forest covered one would be three hundred and eighty-four thousand gallons per acre, or three hundred and eighty-four million gallons for a thousand acres.

Other experiments in England show that the evaporation from an open vessel in a room is eight inches in a year, while in a field or open place it is estimated at between thirty and forty inches. The soil in a forest being protected by the trees to a certan extent as though under cover, we may infer that evaporation would be less under such conditions than in an exposed place. It is a matter of common observation that roads running alternately through woods and open country remain longest moist in the woods. Railroad cuts show the same difference. Houses in forests are damper than those in the open. These facts go to show that evaporation from the soil is slower in a forest than elsewhere. The only exception to this is where water is in excess. The evaporation activity of the trees is then excited to such an extent as to neutralize their productive effect upon the moisture in the soil itself. Thus trees in a swamp have a drawing effect, while upon dry soil they will maintain humidity.

Nothing is better authenticated, both by scientific and general observation, than this last effect. In California we have learned to help the soil and maintain a moisture, by making it a mulch for itself by cultivation. But this artificial process is improfitable upon the steep mountain sides where our forests are of most importance. Such an attempt would only result in the washing away of what soil there is on the mountains. In this connection it may be well to note the value of thorough cultivation. The dry soil contains 13 per cent of moisture. Schubler's experiments show that soil that weighs about a thousand tons per acre, and thoroughly pulverized and dried, will absorb from the atmosphere in twenty-four hours:

Sandy clay	26 tons of water.
Loamy clay	30 tons of water.
Stiff clay	36 tons of water.
Garden mold	45 tons of water.

We are all familiar with the absorbative capacity of common salt. Carbonate of potash has also notable affinity for moisture; but it is the humus of the forest that possesses this power more than any other soil, absorbing to again give off from two to four times its weight in water. Forests mulch the ground under them. It therefore becomes plain that forest fires, when not destructive to the trees, diminish the capacity of the forest for retaining moisture. The trees also protect the earth under them from the heat of the sun. Soil in the open is raised in temperature by the sun, at a depth of one foot, 15° more than in a forest; consequently the abstraction of moisture is correspondingly larger in the open. The difference is one hundred and thirty to one thousand in favor of the forest. On the other hand the experiments cited by Marsh show that in winter soil has been frozen to a depth of six feet on a bare knoll, while in the adjoining forest it was uniformly above the freezing point. This is most important in California in our high mountains, for rains upon frozen grounds must run off without penetrating. So bare places would not act as reservoirs for later use, while the forested land would. Forests protecting land from excessive heat, protect the snows from rapid melting. The last place from which snow disappears at the same elevation and isothermal line, is the forests. To the irrigators of parts of Central and Southern California this is of great importance; for with the forests the snow water of spring and early summer is long maintained, while without it the melting of the snow must be more sudden, and the water resulting from it flows off in floods to be dissipated when it is most needed.

Another effect of forest action is that the snows in them melt from the ground side most, and thus can reach the conduits that supply the spring, while snow upon frozen ground melts from above and runs off rapidly. The desiccating effect of winds is often great. Our dry winds in this State do much damage to fruit trees, and dry the grain in the milk, diminishing the crop. Forests have a modifying influence upon such winds. In fact, a dry wind cannot originate in a forested country, and as it passes over forests is diminished in intensity; even a belt of trees will have a pronounced protective influence on crops, and trees to leeward of them and for some distance to windward also, for the trees bank up the air on this side, as is known by hunters, who in striking a light place the shelter of their hand on the lee side, having the light in the direction from which the wind comes.

Trees, protecting the ground from the rapid radiation of heat, prevalent in bare places, diminish frosts. Thus a plant under shelter of a tree is less likely to be frozen than if it were in the open. But trees protect in this respect in another way. Megucher's experiments in Lombardy show that trees, like animals, maintain a constant temperature, that is somewhat modified doubtless, as it is in animals, by hibernation. This temperature for trees is 54°. Forests in a country, therefore, have a similar effect to the sea. They maintain a more even degree of humidity and of temperature, and equalize the climate.

The deposit of dew is more copious upon vegetation than it is upon the soil. Experiments show the difference to be more than double. The exact figures are: for grass, 4.75; for a white surface, 2.00.

In walking through grass or bushes after a dew the moisture will be apparent as compared to bare land. Fogs and mists are to a considerable extent condensed by the foliage of bushes and trees, and drips from them to the ground. On misty mornings I have frequently been wet through when walking in the chaparral of the Sierra Madres, while on the bare hillsides no moisture was visible. At Santa Monica, where I spend the summer, on foggy days the trees may be observed to drip with water, and in thick fogs the drip is so continuous as to suggest rain as it drops on the fallen leaves.

The effects of forests on rainfall is not as yet scientifically determined. The total rainfall of the world would perhaps be no less were forests not in existence, but it seems to be that an examination of the subject must lead us to conclude that the distribution of the rainfall is affected by them.

Forests continually operate to equalize temperature. The capacity of the atmosphere to hold moisture varies with the temperature. This capacity doubles with a mean increase of 23.4° between the freezing point and 100° Fahr. Thus in the spring and summer the cooling effects of forests on temperature must diminish the water-holding power of the air. In walking or riding every one must have noticed the difference in heat between a bare verdureless spot and the shade of trees. This difference is observable even in walking from a dusty road to a grass-covered lawn, thus indicating that the variations of temperature do not depend upon the shade alone. Consequently a current of air saturated for a sandy waste would of necessity, in passing through a forest, part with some of its humidity, owing to the lower temperature. It is from this reason that we see clouds gathering about mountains, when the valleys are under a clear sky.

I have often sat upon the sandy coast of Egypt and watched the sea breeze full of clouds seaward, clear itself on reaching the coast—all the atmosphere over the water fleeced with clouds, while to landward all was sunshine. Our own coast breezes show the same phenomena; the foggy winds of San Francisco soon become the clear breeze of Sacramento, because the temperature of the latter will not permit the moisture to remain condensed.

I have records of many observations of our central States showing that the summer rains are more frequent in wooded districts, and usually follow timber belts and watercourses.

There are also a number of observations on record showing that the electrical effect of trees may play an important part in rainfall. Trees attract electrical discharges, as is known in the case of lightning, and, coupling this fact with an experiment made with a colander so fine that water merely oozed through, from which, on the application of an electrical current, the water poured out of the small apertures, we must conclude that the effect of trees on rainfall through electricity may be considerable.

J. Croumbie Brown even goes so far as to suggest the possibility that trees may manufacture water out of the atmosphere. He says: "The constituents of water are oxygen and hydrogen; the constituents of ammonia are nitrogen and hydrogen; the constituents of carbonic acid are carbon and oxygen; and the principal constituents of atmosphere are air, and nitrogen, and oxygen; with these is combined or intermixed carbonic acid. Carbonic acid and ammonia are likely to be absorbed largely by water, and so carried into the plant. Carbon is fixed, being the principal constituent of wood, and thus oxygen is set free. A smaller quantity of nitrogen is fixed, but enough to indicate a decomposition of ammonia to have taken place; and it is not reasonable to suppose that all the ammonia taken up by the plant may have been decomposed; the nitrogen combining with oxygen, set free by the decomposition of the carbonic acid, yielding material for the woody structure and appearing as atmospheric air, and the hydrogen combining with oxygen and forming water."

The same suggestion has been made by others in regard to insects, such as the white ant of Africa, the cuckoo spit, etc., which secrete large amounts of moisture in places without water.

Whatever the effects of forests may be on the amount of rainfall, it is beyond doubt that their influence on its delivery is of the first importance.

Trees offer innumerable obstacles to the running off of rain. Their foliage obstructs the force of the rainfall; when this reaches the ground, it is impeded by the fallen twigs, and leaves, and the humus, by which it is rapidly absorbed and held as in a sponge. The roots, at least when decayed, form channels into the lower soil. These impediments cause the water to flow very slowly, and prevent it from gullying out the land and forming accumulative channels. Thus the rain has time to sink into the earth, and to replenish the subterranean reservoirs of the springs. The waters percolating out of forests never carry earth in them, as in the case of lands denuded of vegetation. The rate of delivery of a given rainfall from a wooded watershed is much slower, and is much longer continued, than from a bare one. The importance of this will be understood when we recall the French experiments at St. Phalaz. At that place there are two watersheds of nearly equal area and inclination; the one wooded, the other not. From the first proceeds a nearly perennial stream; from the other, a dry gully. The period of delivery of flood waters in the first is five days, while in the second the period is only six hours, and it is but fair to presume from the stream in the wooded one, that it is a delivery of water that months before fell in rain, which amount of water, falling upon the other watershed, augmented its flood.

The first of these watersheds causes no destruction to the roads, nor extensive erosions of the banks of the stream; while the flood from the other washes away the bridges, destroys the roads, and rolls gravel and bowlders into the valley.

Supposing ten billion gallons of water to fall within a given time upon each of these watersheds, from the first the delivery will extend over a period of five days, or one hundred and twenty hours, some of it being permanently retained to supply the springs and stream; while from the other the ten billion gallons will flow off in six hours, with scarcely any absorption into the soil itself; consequently the delivery of water during a given moment during the flood must be twenty times greater in the denuded ravine. Every second of prolongation of water delivery diminishes its height, force, and danger.

It is from denuded and mountainous watersheds that torrents are formed. The undetained waters rapidly form channels and erode the land, carrying earth, sand, gravel, and bowlders in their flow. As the inclination of watersheds diminishes, the debris is dropped—first the bowlders, then the gravel, then the sand, and last the earth and clay.

Standing upon the dikes of the Talfer Torrent at Botzen, in the Austrian Alps, I observed the dry bed of the stream to be on a level with the roofs of the three-story houses at Schlanders, Kortsch, and Lais. The church steeples are lower than the bed of the Gadribach. The watersheds of the Durance, in France, were formerly wooded, as we know by the records of the lumbering corporations that operated upon it. For years it has been denuded, and the river now varies from a vast dry bed of pebbles and sand to a furious torrent. It has covered more than two hundred thousand acres of one of the formerly most fertile valleys of the province.

In Southern California the same causes are already producing the same results. Fires have been set, and are being set accidentally, largely by sheepmen, which burn the brush and forest and prevent new growth. New torrents in unexpected places have formed, and the old channels, such as the Tejunga, Santa Clara, San Gabriel, etc., are more subject to floods than formerly with the same rainfall.

When we contemplate what has happened in other countries, we cannot but perceive that the mining debris of our central valleys is nothing to what must be expected from torrential action from such a chain of mountains as the Sierra Nevada with its easily disintegrated formation, should it be denuded of vegetation and the snows be unprotected and the rains undetained.

The principal sources of danger to be anticipated in this direction are the fires which annually do more and more damage, and the over pasturage of the mountains which tax the earth, destroys the humus, and, through the hunger of the half-starved sheep, causes the destruction of the natural reproductive power of forests, by reason of the eating by these of the growing plants. As has been said and cannot be doubted, the sheepmen in our mountains do every year a hundred times more damage to the lumber, to the streams and springs, and to the retentive power of the watersheds, than the scanty mountain pastures are worth. Sheep pasturage should be regulated as it is in Europe, and confined to forest tracts with such limitations as the condition of the forest requires. In this way the mountain pastures should carry no sheep then; now, under the present system, both forests and pastures are being destroyed.

The secondary effect of denudation of mountains and the formation of torrents is the diminution of springs and streams in their summer flow. The rains rushing off rapidly have no time to sink into the subterranean reservoirs, and consequently the springs must fail. In his celebrated work on the earth as modified by man, George Marsh says:

> As the forests are destroyed, the springs which flow from the woods, and consequently the greater watercourses fed by them, diminish both in number and in volume. This fact is so familiar throughout the American States and British provinces, that there are few old residents who are not able to testify to its truth, as a matter of personal observation. * * * I remember one case where a small mountain spring, which disappeared soon after the clearing of the ground where it rose, was recovered about twenty years ago by simply allowing the bushes and young trees to grow on a rocky knoll immediately above the spring. * * * The hills in the Atlantic States formerly abounded in springs and brooks, but in many parts of these States, which have been cleared, the hill pastures now suffer severely from drought, and in dry seasons furnish to cattle neither pasture nor water.

Marchand cites the following instances:

> When the factory of St. Ursanne was established, the river that furnished its power was abundant, and had from time immemorial sufficed for the machinery of a previous factory. Afterwards the woods were cut near its sources. The supply of water fell off in consequence, the factory wanted water for half the year, and was at last obliged to stop altogether.
>
> The spring of Combefoulat, in the commune of Seleate, was one of the best known in the country. It was remarkably abundant in the severest droughts. Consequent upon the cutting of the wood at its source, this famous spring has become a mere thread of water, and in times of drought disappears altogether.
>
> The spring of Varieux, which formerly supplied the castle of Pruntrut, lost more than half its waters after the clearing of Varieux and Rongeoles.
>
> The Dog Spring, between Pruntrut and Bressancourt, has entirely vanished since the surrounding forest grounds were brought under cultivation.

He also cites the case of the remarkable Wolf Spring, in the commune of Soubry, ninety years ago. The location of this spring was a bare, steep pasture, inclining to the south. Only after the heaviest rains was a small thread of water observed. The pasture was turned into a woodland, when a fine spring appeared, furnishing abundant water in the longest droughts.

For fifty years the Wolf Spring was considered the best in the Clos du Doubs. A few years since the wood was felled, and the land turned to pasture again. The spring disappeared.

Edgar T. Ensign, President of the Colorado State Forestry Association, writes me that consequent upon the destruction of the forests on the east side of Cheyenne Mountain, the perennial character of the springs in that locality has been nearly destroyed. Humboldt, Dr. Piper, W. C. Bryant, Boussingault, Phipps, Becquerel, Cantegril, Surrell, Cezanne, and, in fact, nearly all persons who have given attention to forestry, cite similar facts.

In New York, the diminished flow of the Hudson and of the feeders of the Erie Canal, since the destruction of the woods at the sources of these streams, has caused the State to withdraw all its forest lands from market, to buy other forest lands, and to establish a forestry commission.

Colonel H. H. Markham, Congressman from Southern California, who introduced the Forestry Bill, prepared by the California Board, into the last Congress, in a letter to me says:

I was born, raised, and have always lived in a timbered country, and have watched the effect of timber upon natural watercourses, and I am thereby fortified in my belief that your position is correct. My brother owns a farm in Sheboygan County, Wisconsin, a county heavily timbered. He built a shingle mill on the creek passing through his farm, and ran it by water power, but as the land surrounding him became shorn of its timber, and cultivated, the stream diminished and soon became dry. He sold, and purchased another tract in the next county north, and when I first saw it in 1861 there was a stream running through it containing sufficient water to allow him and others to float double length railroad ties by the hundreds down to the market. The surrounding country was rapidly cleared, and within six years the stream became dry, with no water, except in rainy seasons.

In a book by Palissy, and in several other French works, there are accounts of how to create springs by planting trees upon declivities, and making at the lowest part a cemented wall on the rock or hard pan, to intercept the continual flow caused by the trees. Three or four acres, according to their account, will make a fair spring.

Measurements of the average depth and discharge of water from the principal rivers of Europe have been kept for a long period. Those rivers, from whose headwaters extensive clearings have been made, all show a diminished average discharge of water. Some of these rivers are the Rhine, Elbe, Oder, Danube, and Volga.

California uses much water in irrigation, and in the south pays high for the fluid for domestic use. The value of water here, already considerable, must increase with the population. Consequently it is of vital importance to preserve, at least, the present capacity of the mountain watersheds, to retard the melting snow and the delivery of rainfall, so that torrents shall not form while the springs and streams are maintained.

The State of California has no practical forest system, neither has the Federal Government. The forest lands of the State in private hands are beyond the control of the State Board, and the State school lands, and government lands in forests are common to all for entry, pasturage, etc. No forest officer has any control over them, except to arrest for setting fires in the woods, and even in this the circumstances are so adverse to fixing the guilt for these fires, that with the utmost efforts few arrests can be made and fewer convictions had.

The State sells its lands without any reference to the timber upon them. Where timber land is bought in this State the timber is all that it is bought for, and after this is cut it is usually abandoned for taxes, if, happily, all the school payments due the State have been made. On the school timber sections wood and lumber have hitherto been taken without so much as a by-your-leave from any one.

This Board is, as far as we know, the first official body to ask for an accounting for the schools from the wealthy firms who have taken such timber. We have a special agent and assistants now in the field collecting evidence in these and other forestry cases by affidavits. The amount of money involved is very considerable and belongs to the schools. We are obliged to proceed through the Attorney-General of the State, and hope to secure his coöperation in our work.

The United States land system only allows a man to acquire one hundred and sixty acres of forest land. This is far too little to warrant the building of a modern sawmill; consequently lumbermen have either cut timber without title to the land, or used "dummies" to obtain by fraud and perjury what they required. There are doubtless cases in which lumbermen have good titles.

The Government has for some time had special agents on the coast to secure evidence against illegal cutters of timber. These officers now have a great number of cases on hand, for the practice of robbing the Government lands has been general. One case, that of the United States vs. The Sierra Lumber Co. for $2,000,000 worth of stolen timber, is now on trial, and another involving six hundred fraudulent land entries in Mendocino County, in the interest of one foreign firm, is before the Courts. These are the leading cases of each kind. These lands are almost all worthless, except for the timber on them.

At present there is no management over pasturage here; robbed there; burned everywhere—this is our forest land system.

A few special agents report, a prosecution or two is started, but the Government attorneys, from some cause, bring few to trial.

Fraud and illegality is at a premium in the lumber industry, and the honest man can hardly tell what to do in it to live and follow the law.

Such a system with such results must be bad. A vast property is being squandered, the country endangered, and the citizens tempted to violate the law.

What the timber men want is the timber, not the land. What the people in general need is that the water-holding power of the mountains shall be preserved.

A sensible forest system can sell the timber, while preserving the reproductive power of the forests, and the forest itself as to its water-holding capacity, just as is now done in South Australia, India, and Europe. The forest land ought not to be sold. Not another foot of it should be sold by the State or by the Federal Government.

California has no time to lose in protecting her own forests, and should commence the work at once. National law, or no national law, there ought to be a California law, under California management. This State needs very different treatment, from a forest point of view, in its different sections. Parts of it would be promptly ruined by the removal of even extensive areas of mountain brush, as in the south, while other parts would be much benefited by diminishing the forest area in a reasonable manner, as on the northwestern coast. In extensive portions of the State, plantations of trees should be made, as wind and frost breaks, and generally for climatic purposes, as well as to give local supplies of firewood and timber, while in others there may be an advantage in permanent clearings on the arable lands. The decision in such matters should come under the control of an intelligent State forest management; so also should the commercial cuttings in the forest, to prevent waste; to use only the ripe timber, or judicious thinnings from too close growth to insure reproduction in the forests; to prevent and put out fires; and to secure such fees from the users of forest products as at least to pay the cost of management.

The rapid exhaustion of forests in the United States indicates clearly that the present demands for timber in California must soon be largely increased. The purchase of considerable areas of timber lands by foreign and eastern capitalists shows that this danger is upon us; now is the time to act. The day has come for the United States, as a nation, when the preservation of our forests is more desirable than their destruction. For this reason, if for no other, I recommend the abrogation of the protective tariff on lumber, which taxes the whole people for the benefit of the few lumber combinations, and sets a price upon the head of every tree in the land. Whatever reasons can be adduced for the protective system which places the taxing power of the Government in the hands of private persons, and, at the expense of the masses, enriches the few, none of them can apply to the forests; for these, it is our interest to keep, and not to destroy. All persons, of whatever tariff views, should unite in demanding the repeal of the timber tariff.

It is with pleasure that I perceive the increasing interest in our forests which is appearing through the country, and especially in California. It is with pleasure that I can report a marked decrease in forest fires, where we have been able to send our officers and fire notices. These forest fires are a desolation. Beautiful mountains covered with verdure—the homes of the bee man and the settler, the crops of the farmer, the lumber of the woodman—all are ruthlessly swept away by them, and a scarred and blackened landscape takes the place of beauty and plenty.

It gives me pleasure, besides, to say that there is a good prospect for the recovery to the schools of the value of timber taken from school lands. We shall introduce an Act in the next Legislature, withdrawing these lands from sale, and placing them in the control of the State Board of Forestry.

California, most lovely land—land of plenty, land of the sportsman, the farmer, the irrigator, and of the lumberman.

Here grow the fig and the vine, the orange and the apple, the laughing barley and the rich wheat. In our varied climate we possess delights and perfection found nowhere else. All this riches of to-day, all this promise for to-morrow, is guarded on the mountain walls by sentinels of oak, skirmishers of chaparral, by armies of pine and fir, and the serried ranks of giant redwoods.

These guard our valleys and our streams, we must guard them.

Mr. Stabler: I have been much instructed by the essay of the gentleman, and I believe for one, that the importance of this subject cannot be overrated. I am glad the movement has been made before the different societies of California and the Board of Forestry, and this body for the preservation of the forests of California. They are our pride and should be protected, and if they are destroyed, the industry of man cannot replace them, nor can nature replace them within the life of man now living.

Therefore, I offer the following resolutions:

Resolved, That the fruit growers of California, in Convention assembled, request that Senators Hearst and Stanford, and the Congressmen of this district, use all proper means to secure the passage of the Forestry Bill, recommended by the State Board of Forestry, a copy of which is hereto attached.

Resolved, That the Secretary of this Convention is hereby instructed to send a copy of these resolutions and this bill to each of the Senators of this State and the Representatives to Congress.

Carried.

Mr. Bettner, of Riverside: I have also a resolution that I would like to offer. It has already been explained by Mr. Kinney that the timber school lands of this State are being depredated upon by the parties who take up these timber lands solely with the expectation of denuding them of timber—possibly making all payments and possibly not; and after the timber has been taken off the land is destroyed of all practical value, and the school funds thereby are deprived of the benefit of a good portion of the value of these lands. If these lands are placed under the control of the State Board of Forestry, this income, instead of being spasmodic, instead of terminating with the first or second payment, will be eternal. The State Board of Forestry proposed to draw these school lands from entry and sale and place them under the control of that Board with a view of a sale of the timber, and in this way making a constant source of income accruing to that fund which will continue to all times to come. I therefore offer for the indorsement of such a bill this resolution:

Resolved, That it is the sense of this Convention that all unsold school land and other timber land belonging to the State and in the State of California, should be withdrawn from entry and sale, and that all such timber lands should be placed by the Legislature under the control and management of the State Board of Forestry, and full powers granted to that Board to control the sale, renewal, and preservation of the timber upon them; provided, that all funds accruing from timber sale, or otherwise, shall be turned over to the State School Fund by said Board, after the necessary expenses for sale and management shall be deducted.

Resolved, That the Secretary of this Convention be and he is hereby instructed to forward a copy of this resolution to the next Legislature as soon as convenient.

DR. KIMBALL: It seems to me that there is a great deal in that resolution. While I, for one, am in favor of preserving our forest trees where it is compatible with private ownership, I think it would be a piece of legislation that would not be for the good of the State to lock up all unsold school lands, whether timber or not, in the hands of the Board of Forestry.

MR. BETTNER: I only included the timber land.

DR. KIMBALL: Even in that event I believe there are other methods of preserving our timber, that would be found more effective than that. It would be better for the State to pass some legislation in regard to increasing the price of those lands, and compelling a different amount of payment. It is asking a good deal to lock up such an amount of the domain of this State as belongs to the Public School Fund where it cannot be used. The value of this land, from year to year, will necessarily increase with the influx of population to this State, and the time is not far distant when every acre that will bear trees will be found to bear some other kinds of trees. That will add to the interests of this State, and I believe that other legislation would be wiser, more to the point, and more effective.

MR. STABLER: I differ with Dr. Kimball very materially. Now, the school lands of this State has been subject to sale for nearly a quarter of a century, and they are nearly all sold, only those remaining in the mountains are unsold where there is timber. Now, it is a notorious fact that persons from all parts of the globe are coming here and denuding our mountains of their timber; we want a positive and dead stop on it at this time. I am in favor of checking at this time the sale of the little that is now left. The resolution is rather sweeping, but the time has come for it to be sweeping. Let this resolution go to the Legislature, to show that we are in earnest in preserving what timber there is left. It is not binding on them; it is merely advisory. Let them take it for what it is worth. I hope the resolution will pass as introduced.

MR. SMITH, of San Mateo: The Board of Forestry Commissioners and many gentlemen, who have thought on this subject, believe that such a bill as proposed in this resolution not only will do the State School Fund no harm, but will gradually increase its revenue. The State Board believes that intelligent supervision of these forest lands will gain to the State and therefore to the School Fund. They believe that if these forests are protected that the sale of timber from them will continue, that it will not be a thing of a few years, but a thing of many years, and that eventually, not only the State School Fund, but the whole State will gradually profit by such a proposed supervision.

MR. CHAPMAN: Considering the fact that our Government is now encouraging the destruction of our forests by making a tariff on lumber, I think it is well that we should protect our timber interests, because the very life of our State depends upon her trees, as is shown in the essay of Mr. Kinney. I therefore move that we adopt the resolution of Mr. Bettner.

MR. BETTNER: I do not desire to detain the Convention with any long speech. As I am a member of the Board of Forestry, I feel some little delicacy in saying anything at all in support of the resolution, although I have no interest in it. There is no emolument for that office, and I believe the only object the members have had in any efforts they have made has been the good of the public, and this resolution has been framed with that end in view. It is possible that they may be mistaken, but still the Board has given a good deal of thought to this question, and it is undoubtedly the case that the forest lands of this State are suffering at present from many causes: from fires, and from unnecessary waste and destruction, by wanton destruction of the timber for the purpose of utilizing a very small portion of it, by the destruction of the sheepherders, by destruction by fires which are set, many of them carelessly, many of them purposely, and by many multifarious reasons. Now, I think Doctor Kimball is in error in describing this area of school lands as being so large; Judge Stabler is very much nearer the mark, so far as we have been able to ascertain. He describes them as very limited. Such timbered school lands as remain in this State are generally in inaccessible mountains, or at all events, at such an elevation above the sea as precludes any practical agricultural pursuits upon them; but still a large proportion of the truly agricultural lands in this State, in many cases, depend for their value upon the preservation of the forests that remain. These school lands represent but a small portion of them, and unless the forests that belong to the National Government can be preserved, this matter will cut but a very small figure. All of us who are residents of California are familiar with the great destruction that has been brought by the mining debris, brought down by our rivers. As Mr. Kinney has said, this mining debris is but a drop in the bucket; if the destruction of the forests continue unchecked, when the mountain sides become denuded of their timber the natural currents that will then arise will bring down such amounts of debris, that that which is now brought down by the streams amounts to nothing, comparatively speaking. This resolution is, I think, one that from a pecuniary standpoint in regard to the School Fund, is desirable. The advance in the price of land will hardly check the evil that now prevails. As I understand it, the payments are made in different installments, and one or two installments perhaps are paid, and then the timber is stripped and the land is allowed to revert to the State in a worthless condition; that cannot be changed by simply advancing the price of the land; only a few more dollars would be realized on the first payment, and that would be the end of it.

The resolution was adopted.

THE APRICOT.

Essay by Dr. Edwin Kimball, Haywards.

It was a happy thought of the old mythologist in giving a distinct personality to all things. There was a real life in all; the material as well as the invisible became living, spiritual personalities. The sea spoke of peace, joy, remorse, and eternity. The rolling thunder was the voice of the mountain, and the lightning was the flash of Jove's resplendent armor and his invincible power. The wind spoke with a hundred tongues. Each leaflet of the forest, each blade of grass, murmured the song of hope, love, and exaltation. Nature, far and wide, above and below, was a revelation.

And so to the devoted orchardist, as he walks alone and in silence among his trees, comes the quiet whisperings of their wants, their hopes, and fruition. They trust him like children. His will is their law, for he is their creator. So, in thinking of a fruit tree, we may elevate it to the dignity of a living, breathing personality, that may live after us and bestow its blessings in annual gifts upon our children. Among all our fruit trees, the apricot is one of the most beautiful. Away back in the dimness of years it was first known in western Asia—the cradle of the human race. It has survived the rise and fall of dynasties, and all the mutations of empires and kingdoms. The Assyrian, the Babylonian, the Persian, have in turn planted the imperial tree, rejoiced in its fruitfulness, and bestowed its delicious conserves and delicate wines in offerings and oblations on the altars of their divinities. It still abides in its old home, and may be found in all the Orient. The traveler may now sit under its broad spreading branches from the Euphrates to the Mediterranean, and from the Black Sea to the Persian Gulf. It has followed the march of man and civilization west through southern Europe and northern Africa to the pillar of Hercules. It has crossed the sea, traversed a continent, and found at last in our generous soil and genial climate, the land of promise and hope.

There is no exhibit that demonstrates more thoroughly the richness and glory of our fruit wealth than a well kept apricot orchard. The fruit is beautiful and luscious; the tree is grand and imposing; its branches reach out in their strength and greet the strongest breeze with joy and delight. The almond is only in advance in its bursting blossoms in the spring time, but it is soon overshadowed by the richer, warmer beauty of its expanding petals and golden crown. Its first leaves tell us of its eastern home; tender, delicate, and variegated as the song of the Persian poets. They broaden out in richest green, luxuriant and triumphant in orchard beauty. The orange is solemn, rich, magnificent; it is for all the year, and lives a century. But the apricot comes like a surprise. It runs riot with joy and promise, and culminates like a golden dream of riches. It is at present the tree of hope for many parts of California, and belongs to us alone; for no other State of this broad land can raise the apricot with success and profit. No fruit tree is more vigorous in its growth, more rapid in its development, and swifter in repaying a hundredfold the generous care bestowed by the intelligent orchardist.

The way is clear for the future of a great industry, and the question arises—where in this great State of almost boundless extent and possibilities the apricot should be planted to attain the most productive results. It can be grown on all our hills, in all our valleys, for it is tenacious of life under the most adverse circumstances; but it is in deep, rich, alluvial soils, thoroughly drained, where the temperature is even and where the atmosphere is softened by the breath of the sea, that it attains its greatest size, its most beautiful coloring, and its most exquisite flavor. It is in bloom earlier in the bay and southern coast counties than in the interior valleys; but the intense dry heat of the interior brings the apricot to maturity a month earlier than in the more temperate region of the bay and coast. Thus it will be perceived that the intelligent orchardist will select a suitable location, if he desires, in this branch of orchard industry, sure and substantial results. Many extensive apricot orchards have been planted in this State that have been positive failures, and many that produced indifferent and uncertain crops of fruit. The apricot will grow almost anywhere in California. Down on the banks of the Colorado River, stimulated by the intense heat and abundant irrigation, its growth is rapid, and in fruiting it is precocious. Even under the burning sun and desiccating atmosphere of the Colorado desert, it triumphs and yields its tribute of the earliest fruit in the State to the salamander-like cultivator. It flourishes in the many oases that the hand of diligence and labor have developed in many of the southern portions of the State. From the Tehachapi through the great inland empire of the San Joaquin, along the foothills of the Sierras to the Shasta Mountains, through the broad, rich valley of the Sacramento, in all the valleys around the bay of San Francisco, in all the sheltered nooks of the Coast Range down to San Luis Obispo, where it reaches down almost to the ocean shore and continues to the Mexican line. Here is a wide scope of country where its cultivation is possible; but its success is certain and its cultivation the most profitable where it breathes the salt air of our magnificent bay and looks out from the tranquil shores of the Pacific. The Asiatic coast of the Black and Mediterranean seas has been noted in all times for this beautiful fruit. Greece, Italy, southern France, Spain, and Portugal now cultivate the apricot, and with them we must contend for the possession of the world's market.

We may safely claim the whole North American continent as our exclusive heritage for marketing this fruit. Our superior product and import duties precludes the possibility of any interference with this great empire and its teeming millions.

The varieties of this fruit are marked and distinct. The Moorpark is doubtless the largest and finest flavored of all apricots, but there are many places where its fruit is uncertain, and when it does produce it ripens unevenly. It is the tenderest tree of the whole apricot family. If the months of January and February are too warm its buds swell too rapidly, and a cold rain or lower temperature will chill the sap and arrest the future development of the blossom buds. I have seen this phenomena in three consecutive seasons. The Blenheim, or Shipley, generally sold by nurserymen, has also its disadvantages. While its quality is good, it ripens too swiftly, and in large orchards of this variety there is almost a certainty of great waste in picking, shipping, and properly manipulating the crop. The Royal, all in all, is undoubtedly the apricot for the best results. Always productive, by judicious pruning and thinning it is almost as sure as the seasons. And when properly grown it is of good size, excellent quality, ripens gradually, hangs long on the tree, is eagerly sought by the canning fraternity, and makes a splendid dried fruit.

The planting and cultivation of the apricot embraces a broad and fertile field of investigation and experience. It has been tried on all varieties of stocks and under all imaginable conditions of soil and temperature. Some orchardists have endeavored to compel the tree to grow and produce under the most formidable conditions. If the soil is heavy adobe or a light loam over an impenetrable clay subsoil, then grafted or budded on the Myrobolan plum stock, it can be made to grow and produce some fruit, but the success of the experiment will be as problematical as the conversion of the Mongolian to modern ideas or the Christian faith. The peach stock is widely used and with generally good results, for it grows well where the apricot can be profitably raised. But in deep, dry loams, there is no stock that will make such magnificent trees or produce such perfect fruit as on stocks grown from pits of the Royal, Blenheim, or Early Golden apricots.

The cultivation of this naturally thrifty tree is simple and well understood. The winter months are the best time to plant. Broad, deep holes, and thoroughly pulverized soil should be the sure foundation for the future tree. They should never be planted less than twenty-five feet apart, for it is a tree for a generation of men. When planted the grounds should be kept thoroughly cultivated.

It is possible, and even better, with ordinary winter rains, and deep, generous soils, to produce the most perfect fruit without irrigation even in our hottest, driest, central valleys, while in our more favorable locations of the bay counties irrigation would ruin the quality of the fruit.

The pruning of the apricot tree is the rock on which many young and inexperienced fruit growers, in their anxiety for immediate results, run and are wrecked. It is a tree that, like our youth, needs early and effectual discipline until its habits are formed and it enters upon its golden age of maturity and productiveness. The most prolific of all our fruit trees, its very abundance is a source of embarrassment. The trusting fruit grower looks with delight upon his acres of thrifty trees, bending under their weight of green fruit, and anticipates the golden harvest, forgetting that nature is always prolific and provides securely for a never-failing posterity. The law governing the profitable growth of all our fruits ignores nature's great motive of reproduction, and, by judicious pruning of the tree and thinning of its fruit, preserves, for a generation, the vitality that would otherwise be wasted in a decade of years. No tree demonstrates this more thoroughly than the apricot. A tree will cease to be profitable when its vigor is gone and its vitality destroyed by overbearing of inferior crops of almost worthless fruit. The fruit pulp protects only the precious pit or seed, and nature is indifferent to its desirability for the taste or nourishment of man.

And here is where the skill and experience of man for centuries has evolved through endless experiment and selection all our richest and choicest fruit. Our illustrious progenitors in the primeval Garden of Eden, fresh from the Master's hand, possibly may have reveled in the most delicious and nectar-like fruits, but the presumption is strong that their pristine simplicity and trust in the wiles of the tempter was paralleled also by severe poverty in their primitive pomological wealth. The prudent, careful orchardist must use the knife unsparingly for the first four years, unmindful of fruit, and the tree will grow in strength, symmetry, and beauty. Every branch will have its allotted place, and the sunshine will look in on all the limbs and twigs and give color and sweetness to the ripening fruit. No general rule may be given to the pruning of the apricot, only that its growth may be directed, its exuberance restrained, and its annual growth kept, if possible, in equilibrium. The apricot kept always in vigorous growth, and fruit well thinned, will yield almost sure annual return. With a full setting of fruit, three quarters at least should be removed, and then there will be twice the amount of available fruit pulp at the time of harvest.

The apricot tree is subject to but few diseases. Nature has endowed it with such wonderful recuperative power, that, although riven and broken by the tempest to apparent destruction, it sends forth new branches and is soon stronger than ever. Trees of twenty years' growth may be cut back in the winter months to half a dozen forks, with sloping cuts well covered with a solution of shellac and linseed oil, and they will be renewed in productiveness, quality of fruit, and apparent longevity. Occasionally a tree perishes in May with the blight. From full vigor of leaf and growing fruit it withers in a day. There is seemingly no known remedy for this acute disease, that some seasons affects other varieties of trees. The shot-hole fungus has often trenched on the profits of apricot orchards in some parts of the State. This pest illustrates the necessity of vigilant action in blotting out this trespasser on the most beautiful of fruits. It appears in the incipient stage immediately on the setting of the fruit and the expanding of the leaf, with rough, wart-like specks and patches on the skin, destroying its beauty and seriously injuring its flavor, and rendering it unfit for canning or the market. When the fungus affects the leaf it destro its substance, and the leaf has the appearance of having been riddled w shot. Air-slacked lime, thoroughly and plentifully sprinkled over the immediately after the setting of the fruit and bursting of the leaf, has proved an effectual remedy.

The present large and increasing acreage in apricots is unprecedented in the history of its cultivation. Millions of people in the United States are totally ignorant of its great value as an attractive, wholesome commercial product. As a table fruit, when well grown and thoroughly ripe, it rivals all others. When properly canned, it is the most delicious of all California fruits, and when properly dried, it has only to become known and it will be the favorite dried fruit of the world.

The time has now come when only the best and most desirable varieties should be grown. Extra care should be taken in pruning, thinning, and cultivation, so that only the best, largest, and most attractive fruit should be grown. The canners and shippers will soon accept no other, and the thousands of busy hands now needed will soon have to be increased tenfold; so no time should be wasted on small, inferior, and imperfect fruit, that destroys the reputation and checks the domestic and foreign demand.

The prospective annual increase of thousands of tons demands the most careful preparation and organization to successfully handle the vast amount. It should be arranged with the care and precision of a military campaign. Canners must double their forces, and those that ship should have large numbers of boxes in reserve.

The time is at hand when the grower must depend on drying as the only method of disposing of the vast surplus. Evaporating or machine drying for this large amount is an impossibility. Every grower should provide the means to dry his entire product, regardless of canners or the market. It will sustain the price, and enable him to act independently of the canners and the vicissitudes of the daily market. All possible arrangements should be made for the needed labor. Schools should be vacated in the drying season, and the rising generation have a practical lesson in industry and economy. Trays and all necessary conveniences should be prepared weeks in advance.

Sun drying must be the main dependence. It is cheap and effective. To make a perfect dried fruit it must be thoroughly ripe, and the product will never be a disappointment. The market demands an attractive, even product in dried fruit. To accomplish this, the fruit immediately after cutting and placing on the trays should be subjected to sulphur vapor for twenty minutes in a close cabinet, or box, with sides prepared for the purpose; or placed on low trucks and rolled on tramways into small, close, suitable rooms prepared for fumigating the fruit. It will then rival the most carefully evaporated product. Sulphuric acid, if existing at all, will be found only in infinitesimal quantities. This sanitary question is one for the chemist and public to settle; but the generation that wears tight shoes, stays, eats arsenic, and is saturated with nicotine and tobacco juice, with the necessary adjuncts of drugged liquors, beer, and wine, will hardly call in question the premature and moderate use of brimstone. Upon the proper management of the dried fruit business depends the prosperity of the orchards of this great State.

All of our fruit interests are to-day in the ascendant. Orchards and vineyards will soon cover the land. The olive and almond will soon displace the chaparral on a thousand hills and embellish them with homes of plenty and peace. Surely, this highest of all husbandry should elevate and ennoble the race. The world of fruits, like the world of men, rises on every swelling tide of cultivation, material prosperity, and peace, and ebbs away in their decline and poverty almost to the verge of extinction.

The Ægean shore saw the birth, culmination, and death of a race favored of the gods, in form, strength, grace, inventive genius, and mental power. The artist's brush lost its skill, the sculptor's hand its power to make the spotless marble radiant with life, beauty, and strength. The flowing numbers of her poets and the melody of her minstrels faded away like a dream. The inspiration of matchless oratory was a thing of the past; and with crumbling temples and desolate shrines, art, knowledge, and law passed away. The decline and destruction of a great people means not only moral, mental, and material desolation, but the fading away of nature's richest ornamentation—the flowers and fruits that have adorned, refined, and made glad the race.

Every great advance in the world is preceded by some wonderful evolution in nature's great laboratory of plant life. Thus from the springing blade and bursting ear, ushering in the harvest time, the unfolding blossoms full of hope and promise, come all that is good, elevating, and progressive among mankind; and in the labor and experiences of man in the garden, the field, and among the trees, we may learn the story of his religion, his civilization, and all his life.

DRYING AND CANNING OF FRUIT.

MR. WAGONSELER: I should like to ask the process of sulphuring fruit and afterwards drying it in the sun without any regularly prepared patent drier—whether it can be done, and if so, the cheapest way.

MR. GLADDEN: I dried in the sun, and I have a drier I use to a certain extent. I dried rather more peaches than I sold to the cannery, although the cannery was half a mile from my orchard; but the capacity was too small and could not receive fruit; therefore, I dried a good many peaches. I bleached all of them and dried nearly all of them in the sunshine; but when it come to selling them the man to whom I sold didn't wish to give me as much for my machine-dried peaches as he would for the sun-dried, because he said the sun-dried peaches were the prettiest and were a better article in the market. I noticed this: the peaches dried with the peel on, the under side, the peeling side, of the peach was not as fine a color; it appeared to be a little brown; it was not just exactly the color it was when it came off the tray, whereas the sun-dried bleached peaches were just as yellow on the skin side as they were when gathered; and in comparison of my sun-dried peaches with those dried in a machine in town, Mr. Chapman admitted himself that mine were rather the nicer article. The trays that I use for the sunshine were six feet long and three feet wide. In the morning when we began cutting peaches we filled perhaps two trays, and then placed a can of burning sulphur in a bleaching box underneath, which held six of those trays; and by the time it was full the first put in would do to take out, and I kept the sulphur going pretty much all the time, taking out those which had been in the longest. Our weather for drying was mostly good, though at first we had some fog. The first week of the peach drying we had a considerable amount of fog, but whenever we found a strong south wind, knowing that it would probably be foggy during the night, we would stack the trays up. They were cut to a pattern 6 by 3, made of lumber an inch thick and two inch sides, and they fit very closely; so that in the morning when we put these trays out, when the fog would be dispelled, they did not seem to have received any dampness during the night, while the trays left out and not stacked would be dripping with water; but we only had a short spell of that. The rest of the season we didn't stack them, and when we had a north wind it appeared as if they dried nearly as much at night as in the daytime. I will say, gentlemen, that my success in sun-drying peaches has been all I could expect. I could do a little better next season from my experience. In the market they were very anxious for them, and paid a greater price than they paid for the machine-bleached dried peaches. I had a Champion, a small machine, but when it comes to work this machine, as far as capacity is concerned, there is no comparison between it and sunshine.

A DELEGATE: Which did you find the more profitable, the peeled or unpeeled?

MR. GLADDEN: The peeled peaches were rather more profitable. One thing more. I believe Mr. Hadden is exactly right in saying that we should have the fruit gathered carefully, and should gather good fruit to be dried if we want good dried fruit. I am not in favor of having it bruised, but I took bruised peaches, and after bleaching and drying them they didn't turn black. The color was all there; they were spread out, but they were nice in point of color; but I am not in favor of having overripe peaches, though I want them to be mature.

A DELEGATE: Did you pack your overripe peaches by themselves, or with others?

MR. GLADDEN: We dried them by themselves.

MR. BUTLER: What was the difference in price?

MR. GLADDEN: None at all; but it looked better. I put some of those in sacks by themselves, and when I sold them they said they would give the same, although they didn't look quite the same in shape, but in color they did. If dried carefully in the sunshine, they will dry nicely, although the shape of the peach is not so good.

A DELEGATE: What is the difference in price between your peeled and unpeeled peaches?

MR. GLADDEN: Unpeeled was 12½ cents, and the peeled was 18 cents, in sacks, and the sacks furnished.

A DELEGATE: At those prices, you think you made more money from your peeled than from your unpeeled?

MR. GLADDEN: Rather so when I used lye; but when we peeled by hand, it was much slower than the other process.

A DELEGATE: Did you handle any cling peaches?

MR. GLADDEN: Yes, sir.

A DELEGATE: Did you have any difficulty in removing the pits?

MR. GLADDEN: No; not very much. The worst of it is about peeling and pitting cling peaches. We can pit cling peaches, and dry them with the peels on pretty fine; but if you peel them first, before they are pitted, they are like an eel—pretty hard to handle, using such knives as they have at the cannery; therefore, I didn't try peeling very many cling peaches. We peeled a few with machines, and then tried them with lye; but they didn't peel as nicely with the lye as the freestones, and we peeled with the machines; but the women I had cutting them complained so much of them being so slick, and cutting their hands with the pitting knives, that I concluded that we would dry them with the skins on, and for that purpose we just pitted them with the pitting knives.

MR. BUTLER: Do you find it much more expensive to pit cling than freestones?

MR. GLADDEN: No, sir; they do it very nearly as fast. And I think that my clings turned out dried fruit equal to the best freestone, unless, perhaps, it was the Salway. I have had but very little experience in drying clingstones until this season, and then I dried three tons of clings and was very much pleased with them. There has been objection in my part of the country to planting clings, on account of the difficulty in drying them, and men would not buy cling trees very much, because they would say that if we can't sell them in the fresh state we can't do anything with them.

A Delegate: Which do you think was the better after they were dried—the cling or the freestones?

Mr. Gladden: I think the clings made the prettiest looking fruit. I don't know as I could hardly say, but the cling makes a beautiful fruit. I could not get any more for mine. I exposed them to purchasers, but they didn't give them any preference. I don't think there is any necessity to be afraid of drying clings.

Mr. Block: I would like to ask the gentleman how long he kept them in the sulphur?

Mr. Gladden: Well, about from twenty to thirty minutes. There is a very great difference of opinion as to the proper time. I dried some apricots, and the gentleman who was assisting me says: "You don't sulphur your apricots enough." He said: "In Vacaville they sulphur them an hour and a half." I said: "Are you certain they do that?" Said he: "I know it; I witnessed it; I was right there and saw them drying; and they don't consider an hour and a half any too much at all." I said: "What kind of fruit do they make?" He said: "Very fine; they are away ahead of you;" and I asked him about the peaches. He said: "They don't sulphur them quite so long as the apricots, only about half an hour." Well, I do not know anything about it; but I think from my experience with peaches, from twenty to thirty minutes; and, if you have a good strong fire, twenty minutes would be plenty. I used crude brimstone out of the mine. I tried one pound of sublimated sulphur, and I tried brimstone, but I think a pound of crude sulphur is worth a pound and a half of most anything else.

Mr. Stabler: You said that the clingstone peach could be dried easy without being peeled after taking out the pit; now, there is this process which Professor Hilgard mentioned late in the season, where they use the pit. Couldn't you use that—take the pits out of the clingstones and dip them in that and peel them?

Mr. Gladden: A neighbor of mine tried dipping them in brine, but he didn't do well. I do not mean to say that you can dry clingstone peaches better with the skins on than you can dry them with them off.

Mr. Tompkins: Professor Hilgard speaks of the evil of bleaching dried fruit with sulphur. I know for a long time, I, in common with a great many others, thought he was at fault, and particularly that there was nothing like the damage he claims, but I am a convert to the professor's views; there is no question but what the use of sulphur, and the way it is done, burning it right under the trays of fruit, must impregnate a good deal of it so strongly with what I believe the professor calls sulphurous acid, which afterward turns to sulphuric acid, and that certainly is rank poison. Now, these men who are in the business of evaporating fruit, their idea is to get on the market what will sell the best to-day; it makes no difference to them whether it kills off all the trade we have, or not. I think by sulphuring that we are injuring those that buy of us just as much as we possibly can, especially on the fruits that are dried whole, as some of the large white plums are; the sulphur fumes will follow the stems and impregnate the pit so strongly that it is hardly possible to cook it out. I am also informed by Mr. Coates, that in Europe all use of sulphur in preparing dried fruit is absolutely forbidden. I am also informed by our President, that walnuts cannot be sold in San Francisco that are bleached with sulphur. That is certainly a favorable sign that people are beginning to take a better view of the case, and eat something that is not so nice in appearance, but tastes better, rather than to take something that is quite harmful.

Mr. Gladden: Mr. Hadden seems to advocate bleaching with sulphur, and until the time comes that the injury is manifest, I shall continue to use sulphur, and then I will save the expense of sulphuring.

Mr. Peck: I would like to ask the gentleman if he sulphurs the fruit that he dries for his own table?

Mr. Gladden: We have some put away for our own use both sulphured and unsulphured, but for my own part, I believe I prefer that which has not been sulphured.

A Delegate: I would like to ask the gentleman if he can tell whether it has been sulphured or not, to take and cook it at this season of the year, a month or so after it has been sulphured?

Mr. Gladden: I have been tried on that and could not tell the difference.

Mr. Wagonseler: I find that people in buying dried fruit don't taste it; they want to please the eye. Last year Mr. Meek examined my plums, and he looked at them, but I don't think he tasted them at all; this year, having quite a lot, Mr. Allison looked at them. I don't think he tasted one; and from what I can learn and gather, in preparing dried fruit we have got to please the eye. Now the question arises, if the sulphuring will please the eye, and those persons will buy our fruit sulphured quicker, by looking at it, I say sulphur; if, on the contrary, they don't, we will not sulphur. I know I have shipped apples to San Francisco, which I myself would not eat, and could not sell in our retail market. They were large and spongy, and they brought twenty-five cents a box more than apples that were much more palatable to our country taste.

A Delegate: I think that we are getting on dangerous ground when we have to go to work to poison our fruit to get a market. That is about the way it appears to me. Now, there is a question in my mind but what every pound of sulphur that is used in the fruit produces so many pounds of poison; and if we get a market now, we get it at the expense of the future—that we are destroying our future market by making the present market. Now, will any one take fruit and burn sulphur and bleach it if they have any idea what they are making to be eaten? It is certainly a a poison. If it doesn't spoil the taste and ruin the market, it will ruin the constitution eventually. This is my first season in drying fruit of any kind; and some of my neighbors have been drying, one particularly, a doctor—he dries his fruit; and he bleached it very nicely, and he brought some of it into market, and he says: "This is very nice; this is nice fruit." And he is asked, "How do you make it so nice?" "Well, we sulphur it." "Well, is sulphur healthy?" "I guess so." "Are you using any of it?" "No." "What kind are you using?" "We are using the other kind; we don't sulphur ours." "But, doctor, why don't you do it?" "Well, to tell you the truth, it is poison." Now, I ask this Convention, is that the right way to do? In regard to my own fruit, peaches and apricots, I dried them in the sun, without bleaching. I thought that I would take the chances of one crop, what I had, and would run the risk of losing that entirely before I would bleach it; and if I lose it this time, I will quit. It have not tried to sell it, yet; it looks very nice, and tastes very nice; it don't look as nice as the bleached fruit, but to my taste, it is a great deal better.

Mr. Tompkins: There is another matter about this question of appearance. If it was sold as an ornament, not to be eaten, then there might be some excuse for laying so much stress on the habit of those men who buy and do not taste the fruit. They buy it because a vast number of people in the East want to eat it; they don't want to look at it. If they merely want to look at it, well and good; but when it comes down to a question as to what is healthy and what is not, I have no doubt that sulphur is unhealthy, and furthermore it is unnecessary, for by the process that Professor Hilgard has spoken of, of which samples are shown at the Horticultural Board rooms—namely, dipping the fruit in a solution of brine—a very fair article is produced. It has neither the color nor the whiteness of the sulphur, but it is white enough for all practical purposes, and prevents the edge of the fruit from becoming black.

A Delegate: On what authority is the statement that the sulphur is poisonous?

Mr. Tompkins: On the authority of Professor Hilgard. He may not have said that of itself it is poisonous, but he said that by putting the fruit over the fumes of the sulphur, sulphurous acid is formed, and which turns to sulphuric acid. I know I took the matter up and studied the authorities, and I have come to the conclusion that he is perfectly right, and the sooner we come to it the better it is for us.

Mr. Bettner, of Riverside: I would not undertake to contradict the authority of Professor Hilgard, but when the sulphur is burned it produces sulphurous acid; the fumes of sulphur are poisonous; it is an asphyxiating poison; chokes you; has an irritating effect on the lungs. I do not know that it is poisonous to take into the stomach, that is in any quantities you are likely to take sulphuric acid. Sulphuric acid is produced by passing sulphurous acid through water, and is a very violent corrosive poison; it is not a blood poison, but it acts as a corrosive poison. Diluted sulphuric acid is used as a medicine; it is given as a tonic; so that moderate quantities of sulphuric acid would not poison, but on the contrary would be beneficial to health. Now, for myself, I don't like sulphured fruit any better than the gentlemen who have spoken. I do not think it is nearly as good to eat as plain sun-dried fruit, but still I would hesitate about going to the extent of denouncing this fruit as poisonous. I think the fruit growers ought to be careful before putting such a statement as that before the public: that it is absolutely poisonous. It is true, dealers buy the fruit largely by its looks, but eventually they have got to sell it to the public, and if the public do prefer to eat sulphured fruit, I do not see any reason why we should not give it to them, unless it is really poisonous, which I seriously doubt, and I do not see any reason why the grower should not have the full benefit of it. Now, when the fruit is exposed to the fumes of sulphur, suppose it is converted into sulphuric acid, it is in such a moderate, diluted form that I do not believe it can be injurious.

Mr. Gladden: I desire to say that I am no more anxious than any person in this room to produce a poisonous article of food; but next season if I produce a crop of peaches and go to George W. Meade & Co., or to Allison & Co., and say to them that I am going to have a considerable amount of dried peaches, you bought my crop last season, and I desire to ask you this question, "Shall I bleach them or not?" Well, if the time has come that the people are going to reject bleached fruit, they can tell me that they prefer them unbleached. If they say give us nice sun-dried peaches and we will pay you more for them than if you expose them to the fumes of sulphur, then, gentlemen, I am just as ready as any one else to supply that demand. It will save some trouble and expense. But if, on the contrary, they say to me, bleach your peaches, do not overdo it but make them nice and we will pay you more for them, I shall certainly do just what I did last season. Who knows but what instead of being a poison, that being done in a proper way, it is conducive to health.

Dr. Kimball: I think there is a misunderstanding in regard to sulphuring fruit. I started in to dry this season one hundred and sixty to one hundred and seventy tons of apricots and arranged for sulphuring, but it so happened that I sold large quantities to the canneries and only dried sixty-five tons; and, if I had apprehended that there was any danger to the health of the persons that consumed these articles dried in this manner, bleached, I would be the last person to sulphur. Alameda County has had the reputation of being a high moral county; that is where my friend is from. And, in our immediate neighborhood, we have an old gentleman approximating eighty years of age that stands on that high ground; perhaps a little higher than my friend. He started in to sulphur, and dried two hundred tons of apricots; he made a contract with a dried fruit dealer in San Francisco, and sold his apricots for 11¾ cents delivered in the cars at Haywards, and he thought that he had made a pretty good bargain, considering the multitude of apricots that there was supposed to be in the State, and he agreed to sulphur them. He stretched his conscience just as far as he could and put in a tablespoonful in about a half a ton. As it happened, he came up to look at other parties that were engaged in drying and suphuring, and he saw that some of his fruit was rather dark colored, so he went back and stretched his conscience and put in another tablespoonful. The result of it was that they began to grow a little whiter, and, before the season got through, he used the sulphur pretty thoroughly. But when he proposed to deliver the apricots, the parties from the city came over and they refused to take the apricots because they were not properly sulphured, claiming that they were black and unmarketable. Judge Blackwood is the individual in question. He looked around for a customer for his apricots and sold them for about 10 cents. In the meantime the apricot market had appreciated, and those parties that refused to take them, came over and proposed to take them. He told them that he had sold them, and then they turned around and commenced an interesting suit for about $3,000 damages.

Now, I only speak of this as an illustration of the condition a man gets into that sticks too closely to an idea, and I apprehend that Sonoma County, notwithstanding its high moral standing, when it comes to the financial point, will sulphur her apricots. I believe that the proper moderate use of sulphur in these bay counties, or in the interior, is absolutely harmless. I remember when I was a small boy that they used to march up on certain occasions the young generation and give them sulphur and syrup; I believe in sulphur now. It is quite an important factor in materia medica, and I know that sulphuric acid, to which my friend from Alameda County is so tremendously adverse, is mingled with these preparations that all these invalids and dyspeptics buy, and we know that the American people is a highly dyspeptic race, and the probabilities are that over the mountains they are worse off than we are here. Perhaps, in the line of providence, we have prepared a little of that in order to stimulate and bring them back to the regions of health. I believe that the people usually throughout the State that are engaged in drying fruit, sulphur altogether too much. I am astonished to hear that our friend from Vacaville, with their tremendously hot climate and burning sun, are so fond of brimstone; I think there are some localities where they need it, but that they sulphur for an hour and a half is a matter of astonishment to me. I can comprehend that the fruit under those circumstances would be tinctured too strong even for me or perhaps for the dyspeptics; but the principal idea of sulphuring is to prevent the oxidation that takes place on exposing the fruit to the atmosphere. Now, there are many places in the interior of the State where a splendid article can be produced by merely cutting and laying it out in the sun; the sun is so hot that there is no possibility of oxidation, and the result is a very handsome fruit. But in the bay counties we are under the influence of the bay and ocean air. There is so much moisture in the atmosphere that it becomes a matter of necessity in order to make the fruit presentable and attractive, and to arrest that I do not know of any other method that is so efficient and will be less harmful than a moderate use of sulphur. I believe that fifteen minutes of sulphuring, with good strong vapor, are sufficient. I have sulphured about twenty or twenty-five minutes, but the general idea has been from fifteen to twenty minutes, and I think that the quantity of sulphur is so small that there is no danger to be apprehended from misuse. There is another thing that these parties who are so fearful of poisoning a whole race forget; and that is the people who had apricots from California last year, and the year before, come back every year hungrier than ever. They have got in such a healthy condition, and appreciate our climate so much, that they come here by the thousands to get more of this article.

A Delegate: It seems to me that the amount of sulphuric acid that would be taken with the small amount of fruit that is eaten by any person at one meal would be perfectly harmless. I think that if Professor Hilgard should give us the analysis of the amount of sulphuric acid that one would get in eating, say one of our largest apricots, we would see that the amount would be absolutely harmless—infinitesimal.

Mr. Wagonseler: The apricot question has been discussed. I would like to hear some gentleman as to the best and cheapest way of drying prunes.

Dr. Kimball: I apprehend that the great machine that our friend from Healdsburg believes in would be the most efficient thing to dry the prune. I think that the people who are raising prunes throughout the Santa Clara Valley and various portions of the State have determined that the sun-dried prune is far superior to the machine-dried; that there are certain chemical changes that take place from exposure to the sun, and make a better flavored and a better keeping article, and more satisfactory to the public in every respect. You can take the Washington plum, or the Columbia plum, or any of our sweet plums, and let them fall from the tree and remain just as they are upon the ground, and nature does the work. It is astonishing the wonderfully pleasant results that are produced. A plum that will be very acid dried on boards a foot from the ground, when it is sun-dried on the ground, or near the ground, it seems that all the acid is turned into glucose, and it becomes palatable and positively good.

Mr. Wagonseler: Can prunes be shaken from the tree and remain on the ground and be dried successfully? The reason I ask that question is that Judge McGarvey, in Ukiah, told me the other day that that was the better way to dry the prune, and the cheapest way.

Mr. Gladden: I gathered, day before yesterday, under my prune trees, just as nicely cured prunes as any that I have, and just as well flavored; but there are some objections. It takes a long time to cure them that way, under the trees, and where I live these large rabbits have got a habit of gathering them for me. My idea is never to pick a prune, but always to shake them on cloths of suitable size, and catch what will fall from the tree, gather up the cloth, and empty them into boxes. My next work, after picking, is to have a kettle of boiling lye that will carry an egg, and with a wire basket dip them in until it affects the skin. You will see hundreds of little cracks all over the skin, and by so doing they will dry in about half the time. I took them out and put some in the drier and some in the sunshine; and up in Healdsburg Mr. Chapman, who has some twelve or fourteen tons of dried prunes, sold them at 9 cents a pound—machine-dried—and I sold mine at 10 cents—sun-dried. After dipping them in the lye, the skin being checked, the next process is to dip them into cold water, to rinse the lye off, and then put them out on trays in the sunshine. I got about a thousand pounds of prunes dried, and there came a pretty heavy rain when nearly all my prunes were out on the trays, and it rained considerably, and made them as wet as they could be, and I began to think that I would have to take them in and put them in the drier, and commenced it; but it cleared off, and then I stopped. The sun came out, and went on drying, and I assure you that I found out one thing that I never knew before: that it was about the best thing that could happen, for those that had that rain on were the prettiest I had. Then, after my prunes are cured, I put them in bins until the final process of dipping them one more time, for the purpose of softening them. Be careful not to dip them too much.

A DELEGATE: How about the process of making them glossy?

MR. GLADDEN: I use to a gallon of water one eighth of a pound of golden brown sugar, and to about twenty gallons, two ounces of isinglass or Cox's gelatine. I tried a quarter of a pound of sugar, but it was rather too much. Get it boiling hot, and dip them in; if they are very dry, leave them in a little longer than if they are not.

A DELEGATE: How long do you leave them in the lye?

MR. GLADDEN: The lye is boiling hot, and if it is strong enough to bear an egg, I would say about five seconds.

DR. KIMBALL: I imagine that there is too much sugar put on the outside of our dried fruit. I have heard many who are engaged in the manufacture of prunes say that if you pick up a handful of prunes some sticky substance comes off, and you feel like going and washing your hands. That stuff is calculated to attract the dirt, and I think that it is not at all desirable. I have tried several things in order to get a gloss to the outside of dried fruit; I have used sour wine; I have used cider; and I have used salt water, and I believe that salt water is the most effectual of anything that I have ever tried. When the prunes are properly prepared that way, and kept in the requisite number of seconds in order to render them pliable and soft, I put them in a body and let them even up, and when they come out there is nothing sticky about them, and they have none of that offensive appearance. If you wish anything further, put in a little gelatine, or a little gum Arabic, or something of that kind, but a very little will go a great ways. This salt has another good effect: it is very bad for the larvæ of insects. As to taste, it is unobjectionable; in fact, you cannot perceive it after they are dried.

MR. GLADDEN: I tried another way a year ago for glossing prunes. I dipped some pitted plums, and of course the water was impregnated with plum juice, and then I tried using that water. It glossed them beautifully.

DR. KIMBALL: I know a gentleman who is highly opposed to sulphuring dried fruit, and he prepares his prunes, whenever he wants to put on a fine triumphal finish, by adding so much logwood to give them a fine appearance.

MR. KLEE: As to dipping prunes in salt or sea water, I think it is one of the best methods, and I believe it will prevent the sugar coming on the outside of the prune, as they do in many cases where they have been kept quite awhile.

DR. KIMBALL: I have kept them for a year and a half without any appearance of sugaring.

A Delegate: I would like to inquire of Mr. Klee if he thinks that would be a good way to dry figs?

Mr. Klee: It is recommended for the same purpose with the fig.

Mr. Stabler: I don't think we need object to the use of sulphur till the eastern people themselves complain of it. They have been sulphuring peaches and drying them for the last twenty-five years.

Mr. Gladden: Do you use that salt water hot or cold?

Dr. Kimball: Hot.

Here the Convention adjourned till to-morrow morning, at nine o'clock.

FOURTH DAY'S PROCEEDINGS.

Santa Rosa, Friday, November 11, 1887.

President Cooper, in the chair, announced the following Committee on Railroad Freights: James Bettner, of Riverside; S. J. Stabler, of Yuba City; and George F. Hooper, of Sonoma.

The Secretary read the report of the Committee on Legislation, which was adopted, as follows:

Resolved, That the Government of the United States appropriate an adequate sum of money to be used by the Division of Entomology of the United States for the following purposes:

First—To send an entomologist to Australia, New Zealand, and adjacent islands, the native countries of the white scale bug (*Icerya purchasi*), and of the red orange scale (*Aspidiotus aurantii*), to search for and study the habits of parasites and predacious enemies of the said insects.

Second—To collect and import into the United States, propagate, and distribute in infested districts such natural enemies of the above named scale bugs, or of other noxious insects, as it may seem best to import with a view to the relief of our agriculturists.

Resolved, That we request the Secretary of the State Board of Horticulture to prepare a brief statement as to the importation of the above mentioned scale bugs into the United States, ravages already committed by them, and what is to be feared from them in future if not checked, and to furnish Senator Hearst with copies of the same for distribution.

Resolved, The the United States import duties on green and dried fruits, nuts, and oils competing with similar products should be maintained.

L. W. BUCK,
C. H. DWINELLE,
S. J. STABLER,
ELLWOOD COOPER,
G. N. WHITTAKER,
Committee.

OLIVE CULTURE.

Essay by Hon. Ellwood Cooper, Santa Barbara.

Those wishing to embark in olive growing, I refer to my essay read before the Fruit Growers Convention held at Sacramento, November, 1885, and published in the biennial report, pages 327 to 331, inclusive.

PROPAGATION.

On page 327, under this head, I recommended planting twenty feet distant each way. I still conform to this plan; but I have found it necessary, after about fifteen years' growth, to remove every other diagonal row. This will give the trees a distance of twenty-eight and one fourth feet. The closer planting will pay to do this.

DISEASES.

On page 330, I would add that the only trouble we have had thus far is the black scale. The remedy I have adopted will be found on page 36 of the report. On the subject of olive culture generally I refer to pages 13, and 417 to 424, inclusive, 517 to 534, inclusive. This latter article was written by F. Pohndorff, who has published a memoir on the subject with various illustrations. The book is on sale in San Francisco. Adolph Flamant has also published a pamphlet with various illustrations, to be had at Louis Gregoire & Co.'s, 6 Post Street, San Francisco. These two pamphlets are mostly translations from European works.

I make this observation with regard to varieties and names—that so far as my experience goes, no two authors in the French, Spanish, and Italian works agree as to names; so without further knowledge than the mere translations, no reliance can be placed in them.

The Mission olive, the one I have propagated, is a rapid grower, well adapted to our climate. It will grow in almost any kind of soil if well drained. The tree is well shaped. The berries make good oil—the fact is, I defy the world to excel mine. The quantity of oil I have made from one acre exceeds the statistics given in the various tables. The variety called Picholine, which is being grown in various parts of the State, I know nothing about. It is only after a test is made that its merits can be fully known.

I would recommend to all those who now begin the business, to get a few trees of as many varieties as possible, so as to determine in the near future what would be the most profitable to plant. The olive will thrive and do well in almost every part of California, and, while there may be fruits that yield better incomes, no tree offers so much and so certain as a permanent investment. Oil making cannot be overdone. The demand for good olive oil, at good prices, must increase more rapidly than the production. But those who embark in the business must remember that no trees require greater care to insure profit; and as to oil making, a fine grade can only result from knowledge and extreme care.

In olive growing we are independent of high priced labor; the picking being done in the winter time after all other fruits are gathered. We are, comparatively speaking, independent of the freight question, as the value is great in small bulk. The fruit is not perishable.

Mr. Cooper: I expected to add to these notes, as Dr. Agard, of Auburn, promised to give me the different bearing qualities of the Mission and the Picholine, as he has them growing of the same age in the same orchard at his place. I have not heard from him, and, therefore, cannot speak as to the quantity of berries on trees side by side of the same age, nor as to the time of ripening. Some claim that the Picholine ripens earlier; if that be the fact, and in other respects equal for all purposes, there would be an advantage of propagating the Picholine. But, so far as I have been able to learn, where the two varieties are grown in the same neighborhood, there has been no difference. I have visited, since coming to Santa Rosa, the hills of Captain Grosse of this place, where he has probably five or six thousand trees, two years old from planting, and I must say that Captain Grosse deserves great credit. He has conferred a lasting boon on the people of Santa Rosa, clearing land that, to my eyes, was absolutely worthless, and planting olive trees. These olive trees on the ridge of the hill are probably not more than from five to ten rows wide, following the shape of the hill, and in that respect there will be a great advantage in regard to insect pests, because they will have better circulation of air and more sunlight, and on that account there will be much less danger of insect pests.

I have growing on my place olive trees in the black adobe, in deep bottom land, in sandy land made from the wash of the mountains, in stony hillsides and adobe hillsides, and in table land where the subsoil is probably twenty feet deep, dark clay, and, so far as I have known, there is no difference in the bearing of these trees or in the oil made. At the same time I do not recommend planting any kind of trees where there is a deep, clay subsoil; for it is doubtful if all trees will do so well in such soil. The only test I have ever made in regard to the quantities borne by an orchard—that is, taking all the trees—showed one hundred and twenty-two pounds of olives throughout the orchard, large trees and small trees seven years old from the cutting—one hundred and twenty-two pounds of olives from seven-year old trees from the cutting. The best result in making oil has been ten and fifty-five hundredths pounds in one large bottle of oil; the poorest result was twelve and one half pounds. I could not say whether this was caused by the different years or by less care in drying. We dried these olives altogether by artificial heat, and possibly the best result was because I gave the drying my own special attention. But we have for the tree seven years old at least ten bottles of oil, and those bottles will sell readily anywhere and everywhere at $1 apiece. I was compelled to put the price up to $2—$24 a case—to keep my customers from quarreling about it, and I am sorry to say they quarrel all the same. I ought to have put it up at $5 or $10, so it would have been then a question of money, but I did not wish to do that, and as soon as I shall have a large enough crop I shall put the price at $12 a case—$1 for a large bottle of oil—and that is profit enough for an olive orchard.

Mr. Gray: How much do you dry your fruit?

Mr. Cooper: We judge more by the feeling than by any other mode of test. In picking, the olives must be picked with care, so as not to break the skin, and in drying at a heat over 120° Fahr., it requires twenty-four hours, and by putting the hand in among the olives you see they all feel greasy, and in squeezing they are more or less spongy, a sufficient amount of water having evaporated to allow the liberation of the oil. They have practiced this method since the time of Genesis; that is when olive-making is first mentioned. In the earliest history of the race they never attempted to make oil without drying the berries—at least there is no record of it. I have never made the attempt, and I doubt whether olive oil can be extracted from the berries without first drying them, to evaporate portions of the water. A good deal more heat is required in the early part of the season than later in the spring. We commence picking in December, as soon as the olives turn a purple color—some of them probably only a reddish color, one side partially green—but they are ripe enough for making oil. They require more drying then than they do in the months of March and April, when the water will have evaporated mostly from the tree, when they are hanging from the limb. That, of course, has to be governed by an intelligent person managing the drying. It is supposed that the oil is of a lighter color made earlier than it is later in the season, but as we make it all in the same tank, I do not apprehend that there is very much difference as to the color of the oil, nor as to the quality. In Europe they dry the berries almost altogether in the sunlight. In the coast counties here that is impossible, because we may have a series of foggy days during the process of drying, and then it would be impossible to carry on the work.

A Delegate: At what age do you commence pruning?

Mr. Cooper: We commence pruning in the second year, or the third year. In planting a cutting it is better not to disturb any limbs or branches that grow, because cutting when the tree is young interferes with the roots, and you will understand that if you cut away the limbs and destroy the leaves, you are destroying the breathing apparatus of the tree, destroying the root. An untrimmed olive tree, when small and commencing to root, will grow four times as fast without pruning as if you prune it. The more top it has, the faster it will grow, for it feeds very largely from the leaves, from moisture. After the second year, though, you want to prune. Those that cultivate the limb up to five and a half or six feet must, of course, pinch off all the branches that are making wood rapidly, so as to force the strength into one main trunk; and where lateral limbs branch out, pinch them off at the end, and stop the growth in that limb. But all small branches should be left alone as much as possible until the tree gets eight or ten feet high, and then commence cutting them off, until you get up to five and a half or six feet. Those who want to prune low can start out from four to five and six inches from the ground, and form four or five trees instead of one. I am not in favor of low pruning of the olive trees in the coast counties. We have no fear of sunlight burning the bark, and in ten years you can get twice as much tree with high pruning as you can with low pruning. It grows up to a bush more than a tree, and these shoots vie with each other to get up to the sunlight, while if you pinch them up to four or five feet, you can form a tree much better.

DR. KIMBALL: Does the tree sunburn?

MR. COOPER: I never saw an olive tree sunburn. I have never seen it in the hot valleys, where the thermometer is 110° in the shade during the summer.

MR. WOOLSEY: Have you ever found anything beside the black scale on the olive?

MR. COOPER: I never have. There are a number of insects mentioned in the French book, but I have never seen them in California to my knowledge.

MR. WOOLSEY: We have an olive tree in our garden, and a very beautiful one, and I have found that it was bored thoroughly with the twig-boring beetle. I never found them so thick in the pear as I have in the olive.

MR. COOPER: That was probably the oak-borer, and likely the surrounding oaks were burnt off, and they had been driven down to the olive tree.

MR. TOMPKINS: Do you thin out the head of the olive tree at all to let the sun in?

MR. COOPER: It is not necessary in California. The olive tree is a very rapid grower, and in pruning you have to do exactly the opposite. The theory of lopping off the perpendicular branches, as advocated in the French book by all the authors, so as to allow the lower limbs to bend out and give sunlight to the interior of the tree, is not needed in California. These limbs would all overbear, so that they would break off, and while the tree is rapidly growing, the outside branches, as soon as they would get full of fruit, would bend out, and touch the ground if you didn't prop them up. There is no necessity of inside pruning in a small tree.

A DELEGATE: Does the tree overbear?

MR. COOPER: The tree overbears in those years.

A DELEGATE: Is thinning practicable? Have you ever thinned at all?

MR. COOPER: No, I never have; I have endeavored to cut them so as to save the fruit and make just as much oil as possible.

MR. GRAY: Can you give a description of your present crushing process?

MR. COOPER: It is described in the biennial report. For the last two years I have adopted the same method that is used in Europe pretty generally, except that I have cast-iron rollers that travel around in the trough, instead of stones, connected by a horse, and a shaft inside, with cog wheels on, to turn it around. We put the dried olives in this trough four or five sacks at a time, and these rollers pass around, one after the other—there are two rollers in the same trough—until it is in a condition and looks as much like blackberry jam as anything else I can describe. Then we take it from that trough in that state, and put it into cloths, and we double them over and put slats of wood in between each cheese, so as to make aqueducts for the oil to run out. We pile them up five, or six, or eight, or ten, one on top of the other, and put them into the press and run the oil into the tub; from those tubs it is run into the tanks, and there it has to settle about four months. The oil being lighter, rises to the top, and we draw it off from the top.

A DELEGATE: Do you crush the seed, or do you guard against it?

MR. COOPER: You cannot crush the pulp properly without crushing the seed. I had some seeds sent to a competent chemist—one who is connected with the largest establishment in Philadelphia, and who is also a friend of mine—to test. He found nothing in the seed that could do any possible injury to the oil. In the olives that I have there is not one seed in fifty or one hundred probably, that has any kernel. The kernel is supposed to be mostly prussic acid, and much of that in the oil would injure it.

A DELEGATE: What size would you recommend planting the cuttings?

MR. COOPER: We plant them about fourteen inches long, from one inch in diameter up to two and one half inches. We also make cuttings three quarters to an inch; these cuttings we plant in the field where the tree is to grow permanently. We plant diagonally—that is, the top to the north—to keep the sunlight as much as possible from cracking open the limb that is exposed. We put the cutting about ten inches deep at the foot.

A DELEGATE: Do you saw off the cuttings?

MR. COOPER: We saw the cuttings off with a sharp saw, so as not to injure them. Some have painted or waxed the top, which is a very good plan; I never did. We take the cutting off as soon as we pick.

A DELEGATE: At what age would you transplant from the nursery?

MR. COOPER: Well, my transplanting of small trees has not been very successful, probably from want of care. The trees I plant out from growing in the nursery are as thick around as a chair leg, say an inch in diameter, and some of them are ten feet high. The olive trees that I am going to move in the spring I trim off like a cane four feet high, leaving nothing but a stake, and those that have a good root are sure to grow.

A DELEGATE: How far apart do you plant in the nursery?

MR. COOPER: Just room enough, say six or eight inches apart and the rows five or six feet apart, so that you can work them with a horse. In the nursery we work them every week or two; they require the same care as to grow any vegetable.

A DELEGATE: Do you irrigate?

MR. COOPER: I never irrigated anything on my ranch. I recommend, however, in planting cuttings out on high land, that they had better be watered twice during the season, and the water can be carried in a wagon. I give them about twenty gallons. Generally, when I have watered cuttings, I give about ten gallons at a time to each cutting, and water them twice. Captain Grosse says he has not watered his, but they are all rooted plants.

MR. MCDONALD: Do you think Captain Grosse's will do well without irrigation?

MR. COOPER: I think they will. Those that are growing amongst rocks;

the rocks are so thick that there is no chance for any weeds to grow in between. If the ground were tillable, we might have mustard, tar weed, and nightshade, and everything else to kill out the olives; but there among the rocks he has the advantage of all these weeds.

A DELEGATE: Is a cutting an inch in diameter more desirable than one a quarter of an inch?

MR. COOPER: Yes, sir; nurserymen will prefer an inch to any other size—an inch to an inch and a quarter or an inch and a half.

A DELEGATE: What percentage of yours die?

MR. COOPER: I planted out an orchard last winter of over twenty acres, and I think there are not twenty that are not growing nicely—that is, cuttings set in right from the tree.

A DELEGATE: Did you water them before they started?

MR. COOPER: We watered about the time the ground needed it, without paying any attention to the growth. Some of them had started, and some of them had not started. I had cuttings planted out in March that are four feet high.

A DELEGATE: You advise rooting in permanent rows rather than putting in nursery rows?

MR. COOPER: No, sir; I do not advise it. It is more convenient for me to do it. I plant some in the field and some in the nursery. Where they failed to grow in the field, I substituted trees the following year. It is a very good thing to plant in the field after you have the ground carefully prepared. Plant the cuttings out in the permanent place, and plant a number in the nursery, taking good care of them to make trees to plant where the others fail, and then you have an orchard that is pretty nearly the same size.

A DELEGATE: How much preparation was made in this orchard here that you have spoken of?

MR. COOPER: The preparation here was very great. It was all grown up with bushes, and shrubs, and trees, which were all dug up and dug out by the roots; no better preparation of the soil could be made than that it was all completely thrown up.

A DELEGATE: And plowed?

MR. COOPER: No possibility of a horse getting in there; it was too rocky. It was dug over very thoroughly, and most of the grass killed. In some places, where there were little plateaus, and where there was very little rock, the fields were plowed. If this experiment proves a success, it will demonstrate that there are thousands of acres here on the hills, now supposed to be worth nothing for any purpose, that can be used for olive culture.

Let me say a little more in regard to the insect pests, or of the black scale. It is necessary to commence when the trees are small. They should be gone over in the month of April, certainly not later than the tenth of May, and every little tree should be examined; and wherever is found one of these black scale, they should be picked off by hand, and in that way prevent their propagating on the tree. There is no way you can keep the scale in check so easily, so cheaply, and so surely, as by picking them off by hand when they are small; and then if some trees happen to get a good many on, I would thoroughly wash that tree, using a hand syringe with whale-oil soap, or a decoction of tobacco, or caustic soda—one pound of caustic soda to four gallons of water. It would not pay in such a small way to make a kerosene emulsion, so as to be sure not to let the insects start in the orchard. I will read you a report I made to the State Board of Horticulture several years ago, on the subject of the insect, to show you the danger before you: "The olive is a rapid grower, bears abundant crops; it would seem to be the tree of all others that should claim the attention of the people, and its planting be encouraged. There is yet, however, much to learn to enable the grower to keep his trees from the black scale. No other tree seems to yield so readily to the attack. The increase is so rapid, and the insect is so persistent, that it is yet a question whether, in large areas closely planted, it can be kept in check at a cost that the fruit will warrant."

I have no modification to make of that caution. I have spent probably a dollar to a dollar and a half a tree each year in fighting the black scale, and can only barely keep it in subjection at that. This black scale seems to have been created for the olive, to make us careful, energetic, and persistent, to keep us at work. While one washing each year with the kerosene emulsion will keep an orange tree, a lemon tree, or a lime tree free from the black scale or the soft orange scale, the olive tree requires two or three and four washes to have the same result. My orange trees are just as clear and clean—that is to the naked eye, apparently—as those grown at Riverside, where they have no black scale at all. Of course there are insects there on the inside, but they are easily kept down by washing with the kerosene emulsion once a year. On the olive tree I confess I do not know yet the proper time of the year to do this washing. For two or three years we have had so much rain in the winter time that I could not get on the ground. Our wagons were so narrow in the tire, and the ground so soft, that there was no possibility of getting a washing apparatus over the field, but now I have wagons made with the tires six and eight inches wide, so as to be independent of the soft state of the ground; and this winter I am going to practice, in the month of December and in February, washing with the kerosene emulsion, to see whether it will not be more effective than it has been washing later—in April and August. The insects commence hatching in June, and if they would all hatch out in June it would be an easy matter—or if they would all hatch out in July—but I have known them to hatch as late as the month of February—and while simple washings will kill the little ones after they are just hatched, it will not affect those that are half grown. If you defer the washing until after they are all hatched, the first hatching is more than half grown, and has already formed its shell and affixed to its place. That is the great difficulty with the black scale; it has but one brood a year, but that brood takes four or five or six months to appear upon the scene.

A Delegate: Does this particular black scale exist upon any other trees?

Mr. Cooper: It commits great depredation on the walnut in the coast counties, and I have grave doubts whether the apricot growers upon our coast will make a success unless they wash the tree; but wherever there is an olive tree, there you will find it.

A Delegate: How do you apply the spray?

Mr. Cooper: We use the San José nozzle, mostly, because it is most convenient; but we discard the little tin with the opening and substitute India rubber, so that, if the sediment not properly drained gets in the material with which you are washing, it causes the rubber to expand a little and let it out. That is the best spraying apparatus that I have seen yet—a San José nozzle with a rubber diaphragm which takes the place of the little brass plate on top.

A Delegate: What are the cuttings worth?

Mr. Cooper: I have been selling them for five cents apiece, one inch in diameter and fourteen inches long. The smaller I sell two for one—that is, two and a half cents. That is the price they generally sell for in

Southern California, packed and put up in the proper manner, and put on the wharf for shipping. Thinning out gave me a large number of cuttings last year. I thinned out one whole orchard that was fifteen years old; I have another fifteen years old that I shall thin out partially this winter.

A Delegate: You disinfect the cuttings?

Mr. Cooper: I disinfect everything. There is no trouble about the cuttings.

Mr. Dwinelle: You have a peculiar apparatus for picking?

Mr. Cooper: Yes; I use a common ranch wagon, with a platform on it that reaches up to the limb, and I drive on one side of the tree as close as the platform will permit, running under the tree so that the pickers can stand and commence to pick the lower limbs, while others can stand higher; and then we have ladders fastened with iron bolts that lay up against the tree. We have that apparatus fastened to a canvas cloth that buckles around the body and goes around the neck with clasps, making something like a scoop, so that these pickers can pull the berries off with both hands. We do not care about having some leaves in with the olives, because we pass them through a very powerful fanning mill—the largest fanning mill we can get for cleaning grain—to blow the leaves out; and doing that will take all the dirt out, and the olive comes out of the mill perfectly clean, ready for the dryhouse. The pickers come in at night with the day's picking, and the first thing in the morning we have that cleaned and put in the drying house. With a fair crop, averaging the whole season, a picker will average three hundred pounds per day, so we calculate that as a day's work. I do not hire Chinamen by the job; I have them by the day, and my pickers all make a pretty good average. I tell them if they can't pick that many they will be discharged. They know we know how many a man can pick—an able-bodied man can pick three hundred pounds a day. We pick them clean from the tree. Beginning with the ripest tree and taking the others later, we take everything off—pick all the olives that are on the tree, green, red, and purple. If there are any green ones on it we finish them up.

A Delegate: At what stage of ripeness should they be picked for pickling?

Mr. Cooper: There are two theories. Some say before they turn red, others when they are entirely purple. For the pickling it is better for the ripe olive that they turn a purple color, but they have to be picked with great care and handled with great care. We pick them in water; that is, pick them and drop them in water, so they won't be bruised, and we take into the field a tub with water in it and the pickers empty into that, so that there cannot be any bruising. Even in pickling them we handle them in the same way. Every day we handle them we handle them in water, and we aim when we are changing the water to get the olives that are in the bottom one day on top the next, changing the water every day, and in that way you will not find one that is imperfect.

Mr. Gray: How much salt do you put in?

Mr. Cooper: We buy the best Liverpool salt, and boil. The first salting, after changing the water every day for thirty or forty days, according to the ripeness of the olive, we make a mild brine about half as strong as would bear an egg, and leave it in that brine two or three days. Afterwards take the olives out of that brine and wash them in cold water. Then we make a brine that will just about bear an egg, boiling the brine, and in that keep them for an indefinite period. I have kept them three years, and every olive that comes on the table is just as perfect, just as full, as when picked from the tree.

A Delegate: The first washing is in clear water?

Mr. Cooper; Yes, sir; we do not wash, we soak them—keep them in water thirty or forty days, changing the water every day.

A Delegate: You do not use lye?

Mr. Cooper: No, sir; I never did. I never tried that method, though some do.

A Delegate: How far apart do you plant the trees?

Mr. Cooper: Twenty feet each way.

A Delegate: Which do you consider the most profitable—pickling or making oil?

Mr. Cooper: I am prepared for making oil, and have only pickled a few. I should think there was more profit in pickling on a small orchard, but where you have six or seven thousand trees in bearing you have enough to do without trying to pickle.

A Delegate: Is the refuse, after you have taken the oil out, of value for any purpose?

Mr. Cooper: I have never made any use of it excepting to feed it to pigs. It makes excellent pig food. They use it in Europe to make what they call a third quality of oil. They pour it in a large vat, pour boiling water over it, and it ferments, and the oil that is left is then liberated, comes to the top, and makes a very good oil for burning.

A Delegate: Do you think there is more profit in olives than in any other fruit?

Mr. Cooper: I couldn't answer that question. All I can say to the audience is that I am planting olives and not planting any other kind of fruit trees.

Mr. Butler: I have a place near Dr. Agard's, of Auburn, and I have some two hundred of the finest six-year old trees. The conditions may be somewhat similar to Dr. Agard's. Mr. Cooper speaks of a comparison between the Picholine and the Mission. So far as I am concerned I would give a preference decidedly to the Mission. They commence bearing about the same age, and while there are not many more on the Mission, the Picholine are so much smaller it gives a decided advantage to the Mission. The Piçholine may be slightly earlier but not much. I think the Mission is decidedly better.

Mr. Klee: From seeing the Picholine in different parts of the State, I was impressed that it ripened five or six weeks earlier than the Mission. I think that I found it to be considerably earlier in Placer County, but of course Mr. Butler speaks from his own experience. Mr. L. A. Gould, of Auburn, sent me word that they ripen five weeks earlier than the Mission—ripe enough to make oil five weeks earlier than the Mission. While I am speaking about the Picholine, I would like to call the attention of everybody to the fact that it is a very small olive. The impression has gone abroad that it was a very large olive, and a great many people, Mr. Butler among others, were deceived into buying it, thinking it was a large pickling olive. It is not so, nor should the true Picholine be a large olive. In Pomona I have seen the Picholine, and Mr. White, of that place, thinks quite favorably of it. He claims that although much smaller, it bears fully as much as the Mission; and that, owing to the more even ripening, it is easier to gather. It comes off the stem quite readily, and a man can very quickly strip the limbs of the olive. That is his experience there.

Mr. Flack: I have been trying for two years to raise the Mission olive from cuttings in the nursery, and I have failed to find any method by which I can get more than ten to twenty per cent to grow. Those that have grown are from five to five and a half feet high. My cuttings were from half an inch to a quarter in diameter, and they were placed on the finest nursery ground that you could find in Sonoma County. They were put out in December, February, and March, and as they have been sawed for some time, I took the knife and made a fresh cut, and they were on soil which would retain the moisture. I would like to know why I had not better success.

Mr. Cooper: What was the nature of the soil?

Mr. Flack: It was what you would call a willow bottom with sandy deposit. It was in a perfect state of cultivation and pulverized.

Mr. Cooper: It is necessary when you plant olive cuttings that the ground should be thoroughly cultivated. It should not be wet; it should be warm. It is useless to plant out olive cuttings in cold ground.

Mr. Flack: This would be what you would call real good melon ground. I cultivated it about two weeks to try to get it perfectly loose.

Mr. Cooper: I am asked about what time would be most favorable for the propagation of cuttings. I have recommended from the twentieth of February, depending on the season. I have found in watching the season the last few years, that when we have considerable rain during the months of December and January that we were likely to have an earlier spring—that is, less rain in the spring—and in such a season I should plant them earlier. But, as we had two or three years ago, and I think two or three winters in succession, no rain till late in January, then the spring and summer rains lasted much later in the season, and necessarily would delay our planting. Under such circumstances it will not do to plant in March, or they will all rot.

The hour of adjournment having arrived, a recess was taken until the afternoon at two o'clock.

Afternoon Session.

FERTILIZATION OF ORANGE ORCHARDS.

Essay by A. Scott Chapman, San Gabriel.

Having had experience only with orange orchards, I will confine my remarks entirely to them.

The present outlook for the crop in the southern part of this State is not large, but the fruit is of larger size and better quality. But in those particular places which have been called to my notice, where they have fertilized, the crop is heavy. Peculiarly is it so in Riverside, where these people deal in corners in sheep manure and commercial fertilizers. The effect of the fertilizers on the Australian Navel in our orchard is very marked, for it generally happens that there are on this tree a great many oranges that do not develop the proper characteristic. This year the stamp of the fertilizer is plain.

HARDPAN.

In many orchards of the State, we hear of the formation of hardpan. It is my observation and study that if the people would do less cultivating and plow under vegetable growth, that they would receive much better results; and this, with an occasional liming, will prevent any hardpan from forming. The objection to this in the southern part of the State, is that the weeds, if allowed to grow, would pump all the water out of the soil, and that the trees could not live through the summer. To such, I can only answer: irrigate. We have walnut trees on our place at San Gabriel that we have not plowed for two years, but we have thoroughly fertilized them, and never before did they bear as many and good a crop as this fall, and I may say the same of our lemons. And again, we have a particular plot of about five acres in our orchard where we have not allowed a weed to grow, cultivating after each irrigation; but this orchard was fertilized with sheep manure at each irrigation, and limed last winter at the rate of ten barrels to the acre. These trees will average twelve feet in diameter and fifteen feet in height. They are literally covered with fruit, and will average six boxes to the tree.

SULPHATE OF POTASH VERSUS MURIATE OF POTASH.

> Muriate of potash, no matter what its strength, may answer well enough for clover, grass, corn, and ordinary root crops. But it is objectionable in respect to sugar beets, tobacco, and potatoes. The chlorine in it hinders beet sugar from crystallizing, and in some soil tends to make potatoes waxy rather than mealy. It impairs the quality of tobacco leaves to such an extent that they command a lower price than would have been the case if another kind of potash had been used.—STONER.

Mr. Mapes, of New York, manufacturer of Mapes' manure, claims that it is superior in every way, in that the chlorine of the muriate unites in the soil to form chlorides, which are poisonous to most plants; whereas the sulphur in the sulphate unites to form sulphates, such as plaster, things useful to vegetation.

I call your attention to these facts, because at present on this coast the muriate of potash is used in artificial fertilizers.

MR. HATCH: In regard to the care and cultivation of fruit trees, I would like to say, in my opinion there is too little care taken of the trees and too little cultivation done as a rule. In fact, my opinion is, that in many places where irrigation is deemed necessary, where there is plenty of rainfall, that it dries out for want of cultivation, and that if there were thorough cultivation there would be much less necessity for irrigation.

MR. GREGSON: Being here in this country since 1850, I have been incessantly in the fruit business and potato raising, and so far as fruit is concerned we have generally been successful; we are not troubled by any of your scales. I was very glad to hear of the remedies here for this awful thing should it strike this part of our beautiful State. We are bothered a little with an imported article, which is the codlin moth, and this year, being an old man, not much able to work about the labor, I gave my attention early in the spring to fighting the codlin moth in the old fashioned plan, as Mr. Cooke of Sacramento recommended to fight it, to wrap a cloth around a tree, and go every ten days and find the codlin moth and destroy it. The success of it is shown in my orchard by a good crop of winter apples and no codlin moth. The codlin moth has generally been our worst enemy. Now, sir, I am glad to know that the State Board of Horticulture has seen fit to come to Santa Rosa and Sonoma County; you are talking to men here to whom you are doing a great deal of good, and it is thoroughly appreciated. I feel that it is good to be here and to listen to your intelligent advice as how to save our country from this calamity. I have been very much interested in reading the reports, but I did not think that the State Board of Horticulture consisted of practical men right from the orchards, endeavoring to benefit the people. I am glad to see you are, and I wish you success, and I hope that the State will continue to give its patronage to such an able body of horticulturists.

The Secretary read a letter from H. C. Ford, of Santa Barbara, President of the Santa Barbara County Horticultural Society, as follows:

SANTA BARBARA, November 4, 1887.

ELLWOOD COOPER, *Esq., President State Board of Horticulture:*

DEAR SIR: Some time ago your Secretary intimated to me, that if the people of Santa Barbara so desired, he thought our city might be chosen as the place of holding the State Convention of Fruit Growers, in April, 1888. I brought the matter before our Horticultural Society at our late regular meeting, and after a unanimous expression of sentiment in regard to extending an invitation to your Board to meet here, I was appointed to confer with you, and have you present this invitation in behalf of our Society, and the citizens of Santa Barbara, promising that if Santa Barbara is chosen as the place for your next meeting, that the Society, and her citizens, will do all in their power to render the same the most successful meeting of the kind ever held in the State.

Very respectfully,

H. C. FORD,
President Santa Barbara Horticultural Society.

GENERAL M. G. VALLEJO: I do not know if I can say anything as to the letter just read. I have been quite ill for two or three days, but I must say a few words about Santa Barbara County. I have known, since 1822, all the coast from Gaviota, as we call it, to San Buenaventura. In times gone by we had in Monterey a big lawsuit, and a brother of mine was in charge of it, and he took me down to Santa Barbara. I remember quite well, though I was only thirteen years of age, but large enough to remember everything, and I verified my ideas afterwards. When we reached Santa Ynez, which seemed to us at that time a very long distance from Monterey, traveling as we did in those days from one Mission to another on horseback, carrying home-made biscuits on our horses. We went to Soledad, San Antonio, San Luis Obispo, then to Santa Ynez. We rested there at a big mountain—it was a big mountain then. Now it is no use to talk about big moutains, for holes are made, and they go through them. That is nothing now; but then we rode up on a mule, and it took half a day to reach the top of the mountain, going down the same way. I reached a big ranch there by the name of Rancho de los Ortegas, or Refugio, as it is on the maps, which property was bought by the pirates in 1818—they bought the whole thing. In 1822 we stayed at the house of Dolores Ortega, in a little ravine, or little valley, called Tayigasas, which is now owned by Mr. Emile Hill, of Santa Barbara. He was a real full-blooded Yankee. He came in the schooner with my brother-in-law, who owned the land near the Salinas Valley, near the Refugio Ranch then, and in Santa Barbara County now. We found there about four acres of vineyards, and they made wine and raisins—what we called dried grapes—and he had a dozen or so of very fine orange trees. That was in 1822. At that time there were oranges near Santa Barbara, and there were oranges at Santa Barbara—at the yard of the Commandante, Don José de Noriega. He had several trees there at the military post. I was there in the month of April, and about one hundred of my relatives gave me a picnic in the old-fashioned style. San Buenaventura had plenty of olives and oranges, too, at that time. Now, Mr. President, Santa Barbara was unknown by our people, because that range of mountains took everybody back except those who came by water; but now there is a railroad, which comes by way of Newhall, into Santa Barbara; and the other day they got to the ranch of our honorable President, Ellwood Cooper. That unknown business is a thing of the past, for there is another road to Paso Robles, and which is going to meet them at that place. Well, Santa Barbara now is a very important county—not so large, not so abundant with hundreds of leagues of soil, but a rich, good climate, plenty of oranges, plenty of olives, good pears, potatoes, and everything else—and, beside that, a good, gracious people.

Mr. President, the question in this Convention is now, if I understand the reference in the letter, that the next Convention be held in Santa Barbara in April. There is no use to talk much about it. I would be glad, if I was a miraculous man, to inspire everybody in this Convention to vote with me to go to Santa Barbara with us next April. In the early days when I was there all that was to be seen was the old Presidio, the old Mission on the hill, the house of Don Carlos Carrillo—an adobe and tile house—the house of a first cousin of mine, and three or four houses that were outside of the old square, and one or two at the old fort.

Now, sir, I went there afterwards; I went there the other day. I was met at the wharf by a young man, the owner of the Arlington Hotel. "Is General Vallejo on board?" were the first words I heard. He gave me a card and said, "Here is a carriage at your disposal, sir." I didn't know anything about it, but I didn't mind. So I went there, and after I had stayed at this magnificent hotel, the Arlington, a day and a night, I went to the counter to pay. "All paid, sir," the clerk said. "Who was the invisible man?" I asked. "Well, I received a letter from Los Angeles, to the owner of the house, to keep you any time and all paid." So I was not very glad, for I always pay my expenses; but in coming out of the flower garden in front of the hotel, which is very pretty, I found there a young lady of fine appearance, and she called me uncle. I said, "Who are you?" "Well, you are Uncle General Vallejo." Well, I didn't deny it; so I gave her my arm, and coming down a little bit, I hunted for the old fort and for the old people, and I didn't find anything in there but the old church of the Presidio, which is now of brick instead of adobe. It didn't suit my eye, but at last I came to the house of Don José Noriega, as they call it there. So in going around the first corner I found four nieces. Uncle here and uncle there was all I could hear, and going on a little further I found the house of Don Pablo de la Guerra, whose daughter is the wife of Mr. Dibble. I found eight or ten nieces all around, and I had a very fine time; so I stayed there about eight days hunting for old reminiscences. I remembered an adobe here and there. Now, nothing but nice houses are to be seen, fine streets, post office, groceries, and apothecaries, notaries, and a devilish good pile of lawyers, too. I walked down to the beautiful house of Mr. Dibble to see a great panorama; that is, it appeared that way to me. Steamers pass daily by the Santa Rosa and Santa Cruz Islands. Now Santa Barbara is well known, and I move, Mr. President, if it is in order, that the next Convention in April be held there, and that all those interested in horticulture go down to Santa Barbara and establish the real fact that Santa Barbara produces everything. Last April I went as far as Mr. Hollister's, and as far as Mr. Cooper's farm, and it looked like a glorious place. He gave me a nice bed and a good ride in a nice carriage, and I saw the whole thing; and it was so familiar to me that sometimes my tears came out, and I couldn't help it. I think you are all young here that belong to this Convention; but the old fellows that belonged to the Bunker Hill, for instance, they would go back there and see the grounds when they had been to Salem, or to Cambridge, and they cried. So I went to Santa Barbara to study my old times, and I cried. I say with gratitude, and with everything, Mr. President, and members of this Convention, if you have good hearts, vote for Santa Barbara, and I beg you to do it; and I think I have a right as an old person in the settling of this country, one among the early families, who can also enumerate his relatives that are in Santa Barbara, and they and all the new people now in Santa Barbara I know will welcome you; and one of the best of Santa Barbara's citizens, sir, is the President of our Convention, Don Ellwood Cooper.

A delegate suggested that the printed programme contemplates that the selection of the place for the next meeting should be made just before the adjournment of this Convention, and that it would be better not to deviate from the programme, but to defer the selection until that time.

GENERAL VALLEJO, continuing: I did not intend to interfere with the regular order of business, but the letter just read brings my blood up and excites me a little, and the gentleman will excuse me. I ain't very passionate, and I feel always disposed to do good; and if you know General Vallejo personally, absent or at home, you will find him always right. Now, I made those remarks about Santa Barbara because I couldn't help it. I am now an American, and it is because of my good disposition toward the Americans. I remember when there came to my house, in Sonoma, Sir George Simpson, Governor of India; Governor Douglass, and Governor McDougal, with all their retinue, in 1838 and in 1841, and they asked me if I would work for the protection of England. They said, "We are here to help, and we have steamers, Commodore so and so." And I told them this: "That I be hanged if I accept any European power to keep this country." And Mr. Leese, a brother-in-law of mine, was a witness of that. "That if we Californians have a chance to beat our own flag against Mexico, we'll be a State, or an independent province or kingdom; that we belonged to the American continent, and were opposed to European crowned heads." That was my answer to Sir George Simpson, Governor McDougal, and Governor Douglass. They were at my house about a month and a half, with a whole retinue, and further, they had no bills to pay. Afterwards, French Consul John Gascet, a Frenchman who was in Monterey, and another who was in Los Angeles, came to me to ask the protection of France, and I gave them the same answer, and a little harder, because they understood Spanish, and I had a chance to use my own tongue, but in a decent way, but sharp all the time; so they went. But, fortunately, afterwards I had a conference with the Consul in my own house. We talked matters over, and we made things right. Just coming from Monterey in April or May, all my troops in the frontier here were fighting with my nephew, Alvarado, who was the Governor. And José Castro was a nephew of mine, too, and the whole country there were my relatives—uncles, cousins, nephews, and nieces, and everybody. We fought against each other. Governor Micheltorena said, "How long are you going to fight?" I said, "I don't fight any longer with my own people." And so, in my house, on the fourteenth of June, about six o'clock in the morning, and a very nice morning it was, I heard hallooing, and I didn't know what it could be. There were gates at my place with big locks, and they were so high that I could not see what was going on; and about the first thing I felt was a big rifle on my breast, and another, and another, and another came at me with a knife; and so I was forced to surrender. And I was forced to say to them: "Gentlemen, I am not in the fighting business; you take me; however, it is hardly fair play." So I surrendered myself, and we began to talk. And I saw from the window a piece of cloth representing a flag; the colors were white and red, and in the center was the picture of a bear. This was the bear flag, and these are the facts and the history of the bear flag. I made no tussle over it. I took things philosophically. The grand project of mine was not to go independent. I said, "California must go to the United States, and work with them." So they took me on horseback, and put me in the calaboose at Sacramento; and when I was freed, I came home. Mrs. Vallejo gave me a little bag to be placed on my saddle, and in it were pistols. I then became armed, and assumed my position as General.

Mr. Gregson: Mr. President, with your permission, I would like to say a few words of what I hear. I am a personal witness. Such a sight you will perhaps not see if you hold your Conventions in any other part of California. What you hear the General say is correct. Oh, how I remember the time that I escorted that man, with my old fashioned rifle on my shoulder, over the plains of Sacramento when we had him prisoner there. I was not in Sonoma when we took him. I was there on duty at that time, and well remember Jacob P. Leese, the last man that he has spoken of. How vividly I remember them—excuse me, Mr. President, for it may not be in the line of the business of this Convention—but a few more years and the General will soon pass away, and so with the private soldier, for that I was at that time—he a General and I a private soldier—and so we treasure up these things. Go to Santa Barbara; if I have a word to say, I would say yes. I remember once of being in Santa Barbara with about half a dozen American soldiers, I amongst the rest just returning from Fremont's campaign through that country, and at the Mission we were treated to a glass of olive oil made at the old Mission at that time, and he gave us a glass of wine, the grand old padre; he could not give us any wheat, he could not give us any bread, for he had it not; the tortillas was that upon which the padre lived—flour ground in the morning and in less than an hour baked and eaten. General Vallejo, we have met twice or three times since the time that I stood guard over him, and meet here to-day. I came here this morning ten miles from the westward to see and hear the close of this Convention; and I am glad, Mr. President, for this event of history is welling up in my heart equally as big as the General's. What changes have come over our country since that time! How wonderful it is! The American comes, and he comes with his wand, and nature's face is all changed. At the time that the General speaks of, we all came to the conclusion—Bidwell and every old Californian—that the Sacramento Valley was a wilderness and a desert, and was condemned by us. I well remember, Mr. President, when old Mr. Schwartz, a German who lived on the Sacramento River, produced potatoes; and he would bring potatoes to the fort and to the cabin, sir, as big as walnuts. Now look at it. The American comes and the face of nature is all changed, and the little potato is a big one. What a wonderful country! Fruit abundant, of which I have heard so much talk, was given up as worthless at that time, and now look at it. It is wonderful! And if I have a word to say, go to Santa Barbara. Yes, the old General will go there among his children and among his ancestors. I remember at the Mission of Soledad, when I was a soldier there, I told a little girl that I had stood guard over General Vallejo.

General Vallejo: Stop a little bit—now stop a little bit. Mr. President, you do not see many scenes of this kind. He was one that put me in the calaboose, by necessity. He did not insult me though. I was under the depression of circumstances. I couldn't help it. What is your name?

Mr. Gregson: Gregson, sir.

General Vallejo: By George! I remember you now. You was there. I remember you was there below Sutterville where the potatoes were no potatoes at all; but after the Americans came, that bear flag business was like medicine from a good doctor. He gave a tremendous emetic, and afterward that potato became bigger, and bigger, and healthier. Well, sir, I am glad to see you, shake [they shake].

The motion for the next Convention to meet at Santa Barbara was carried unanimously.

Mr. Tompkins offered a resolution as to redwood forests as follows:

Whereas, The rapid destruction of the redwood forests of this State will entail permanent loss to the beauty of our coast counties, and already threatens the water supply and consequently the fruitfulness and healthfulness of those counties; and whereas, the perpetuation of a large tract of coast redwoods will be of continuous economic value and of continued and increasing interest to science; be it

Resolved, That the Eighth Convention of California Fruit Growers hereby indorse the effort of the California State Board of Forestry in seeking to secure the reservation of such a tract of redwood forests, and recommend their protection to the earnest consideration of our Representatives in Congress.

The resolution offered by Mr. Tompkins was adopted.

Mr. Gray, on behalf of the Horticultural Society of Chico, presented an invitation that the annual Convention in November next be held at that place, and Mr. Stabler, of Yuba City, presented a similar invitation on behalf of the city of Marysville, and the matter was referred to the State Board of Horticulture.

Mr. Stabler offered the following resolution, which was adopted unanimously:

Resolved, That the thanks of this Convention be hereby tendered to the Sonoma County Fruit Growers Association, the Board of Trade, and the citizens of Santa Rosa and Sonoma County, for their hearty welcome to this Convention and the generous provisions which have been made for the facilitation of business and the convenience of delegates.

The resolution was adopted.

Mr. McDonald: I desire, in behalf of the fruit growers of Sonoma County, and especially of the ladies of Santa Rosa, to express in a very few words of gratitude the great pleasure that this Convention has afforded us. It has been not only an occasion of great pleasure, but it has been one of great profit to us, and we will long remember it, and hope that at an early day they may find it convenient to hold a Convention here again.

The business of the Convention here being concluded, on motion, an adjournment was had to meet in Santa Barbara, April next, the time therefor to be fixed by the President.

B. M. LELONG,
Secretary.

PROCEEDINGS
OF THE
NINTH STATE CONVENTION OF FRUIT GROWERS.

Held under the auspices of the State Board of Horticulture, at the City of Santa Barbara, commencing Monday, April 9, and ending Thursday, April 12, 1888.

PRESIDENT COOPER'S OPENING ADDRESS.

Ladies and Gentlemen: This will be the Ninth Fruit Growers Convention and the fifth held under the auspices of the State Board of Horticulture.

Our last biennial report contains the transactions of the Fifth, Sixth, and Seventh Conventions, besides the reports of members and the report of the Inspector of Fruit Pests. It is a work of very great value, and I again recommend it to all those engaged in fruit growing.

Our next biennial report will be issued in October or November of this year, and in addition to the reports of officers, will contain the transactions of the Eighth Fruit Growers Convention, held at Santa Rosa, as also this (the ninth) now convened. I cannot too strongly recommend to fruit growers the necessity of careful study of these reports; every branch of the fruit industry is therein discussed by practical fruit growers. Those who do not study and profit by the experience of others, will be left in the race for success.

I have noticed in the vicinity of Santa Barbara quite a number of English walnuts and other fruit trees being planted on land recently covered by live oak. These orchards can only result in failures, which the owners can ill afford. I call attention to an essay on the English walnut in the biennial report, pages 332 and 333; the precautions there laid down should not be disregarded until it is practically demonstrated that they are without any foundation. I have also been an eye witness quite recently to the losses which must be sustained by bad handling of fruit. Samples of the same varieties of prunes, peaches, and apricots were shown me when last in San Francisco. The one in demand at high prices, the other dull of sale at probably half price. Drying fruit successfully and putting it on the market in good condition, is the key to successful fruit growing. The discussions at the Santa Rosa Convention were more full on this subject than at any previous Convention, so that I call your attention to the same, and especially to the remarks of Mr. Hayden, of San Francisco, and Mr. Gladden, of Healdsburg. In Consular Report, volume 67, page 476, our Commercial Agent at Mayence says:

> If you want dried apples, the American fruit is first offered to you, while a long string of adjectives are thrown off at you in praise of it. These apples are to be met with almost everywhere, and are preferred to all others, on account of the excellence with which they are dried and for their cheapness. For about three years past, may be four, American dried apples have been in the German market, and have met with great success, forcing the native product almost entirely out of its own domain. And it is really a remarkable accomplishment, that the Americans have been able to place upon the market a dried fruit which almost vies in freshness and flavor with the fresh fruit, and yet can be kept at long periods.

It might be appropriate in this place to ask the Convention, during its session, to pass a resolution asking our honorable Senators Stanford and Hearst to request the Secretary of State to forward to our office in San Francisco all the publications known as Consular Reports, for the use of the Board and fruit growers of California. Also a resolution instructing our Fruit Inspector and Secretary to formulate a series of questions for the Department to forward to the different Consuls relative to insect pests, and remedies. This important part of the requisite information to be gathered has been overlooked. In my examination of these books, which has already reached eighty-eight numbers, I have found only three or four notes touching insect pests. Volume 86, page 371, caterpillar plague in Cadiz, Consul Ingram writes:

> For some three years past an insect of the caterpillar species, called *Lepidoptera*, of the genus *Liparis*, has made great havoc among the trees, principally the oaks and the larch. Fruitless attempts have been made to destroy the insect with sulphur, and other means. The Civil Governor has written and forwarded to the Secretary of the Interior, at Madrid, samples of the insect, with the trunk of a tree attacked, asking for Government investigation and aid.

Consul du Prè, of Salvador, same volume, same page, writes:

> Through three months grasshoppers have ravaged narrow districts of Salvador.

New Zealand.—Consul Campbell, in volume 83, page 510, writes:

> The importation of American apples into the port of Auckland is prohibited because of the fear of the codlin moth. My attention has been called to a new and quite novel mode of destroying this pestiferous and destructive insect, which, I incline to believe, is unknown in the United States. A plant called *physianthus* is recommended for planting in apple orchards. The plants twine and grow up the trunk, and spread through the limbs. It would not damage an apple tree to plant this near the root and train it up the trunk and through the branches. The flower is sweet scented, and the moths are attracted to it in great numbers, and, once in the flower, they become prisoners, never to get out alive. It may be that the plant is well known in the United States, but its use as a means of destroying the codlin moth, I incline to think, is not known there.

Professor Wickson, of the University, had a slip of one of these vines in bloom at the Convention at Santa Rosa, and explained its operations, and stated that the plants could be had at the University gardens by any one who was desirous of trying it.

Orange Enemies in Cuba.—I quote from Consul Pierce, volume 65, page 230:

> The chief enemies of the orange tree here are the *gua-gua* (*gow-gow*), and *come-jeu* (*co-may-heu*). The *gua-gua* is a parasite of a whitish color that sprinkles itself over the tree. It may be driven away by putting powdered sulphur on the branches of the tree. I am told, however, that many years ago the attack of the *gua-gua* was particularly injurious to the orange trees of this part of the island, which largely accounts for the comparatively few trees now in existence. It seems that it is much less injurious than formerly. The *come-jeu* only attacks the tree when it is old. If the nest of this insect is found on a branch of the tree, it is well to cut it off and destroy it. I am told that it may be destroyed or driven away by putting soap, lye, and arsenic on the *come-jeu* and tree, and ashes sometimes put around the tree. I have never seen a *come-jeu* that feeds on the bark of trees, but I have seen a "house *come-jeu*," which is much smaller and much less objectionable, and it was to me a thing of considerable curiosity. It got between the roof and ceiling of a house, and worked through the plastered ceiling, and to the length of one or two feet on the side of the wall. It presented the appearance of a large-sized black twine string hanging on the wall. No one would ever have thought, except for the fact that it grew longer day by day, that there was animal life connected with it. It was brushed away with a broom from the ceiling down, but, nevertheless, it continued its growth day by day in the same direction. The black string was nothing more than fine dirt with a hollow in the center, in which the insect lived. This black string is their house, which they carry with them wherever they go. The *come-jeu* of the tree will wind around the body of the tree until the tree is often increased to apparently twice its size, withers and dies.

Fruit Culture in China.—In volume 51, page 585, Consul Wingate writes:

Oranges are the principal fruit raised in the vicinity of Foo Chow, and the small Mandarin has a reputation for excellence. I wrote to Mr. Tang Jeu Fu, the proprietor of an orange orchard of some twelve thousand trees, which I once visited, asking for information upon the questions contained in the circular. I quote from his reply: "In my humble orchard, I plant only one sort, the Fohkein oranges; sweet in smell, warming in character; the outside of common use in the *materia medica*. There are those who plant the yellow Swatow orange; fragrant, and leaving no pulp in the eating. One cannot plant oranges in hill orchards. Even should one plant them, they scarce last a few years. On an open expanse of level ground one must raise hillocks two or three feet high, and plant the orange trees in the hillocks, sealing the roots in solid with mud, or using garden or field earth, as convenient, watering them daily. What they most dislike is proximity to sea and salt water. The method of planting is to plant the seeds; if grafted, they do not fruit in the winter season. Choosing the larger oranges, and waiting until the next year's term (clear, bright weather, April fifth), one plants the seeds in pots or garden, as may be convenient. After two or three years have passed, one transplants the seedling into the garden. Three or four years later they are fit to be transplanted to the hillocks in the open orchard. Another three or four years, and they may blossom and fruit. They are planted, as a rule, about twenty-two feet distant. If the orchard ground be rich and generous, and be constantly cultivated, each tree will bear four hundred pounds in good years. Orange trees bearing of lichens is through their being old trees, and not constantly looked after, resulting in their having this thing upon them. But this tree of itself breeds a bug which first comes to life on the surface of the forks; when larger, it bores and eats its way into the crotches; while outside, it is easily put away, but when it has bored within, one must hook it out with a copper wire. If this bug is not put away before it has eaten deeply, the tree is ruined. Still further, there is a sort of stinking bug (fine as down), that comes to life at the clear and bright term, April fifth; it devours the bud points. When summer begins (May fifth), it grows wings and can fly. In the slightly heated term (July seventh), it may weave its web."

The orchard of Mr. Tang is situated upon the bank of the Yuenfoo River, a branch of the Min. The soil is clayey loam. There were trees in it which he said were a hundred years old. By the yearly application of earth to the trees, the mound comes in time to reach and even bury some of the lower limbs. The material of these mounds is the mud from the bottom of ponds and canals.

Olive Culture.—From the same volume, page 586, Consul Wingate writes:

The true olive is not raised here; what is known as the Chinese olive belongs to an entirely different family. This olive is extensively cultivated, usually on the foot of the hills. The trees are grafted and enriched with liquid manure after the fruit is gathered. It is a fruit that is only appreciated by the Chinese. A peculiarity in its cultivation has impressed me as novel and contrary to our ideas of what would prove beneficial. The young olive trees are planted out in hot weather, and instead of dipping the roots in water, or protecting them from drying, a small fire of straw is lighted, and the roots are held in the flame. The operation, as witnessed by me, seemed much like that of a cook singeing a chicken. The only reason for this, that one of whom inquiry was made could give, was that the trees are hard to make live when transplanted, and that this warming helps in the matter of their living and thriving.

The questions of greater importance to be considered at this Convention are first, *insect pests;* second, *distribution*, and *drying* as accessory to the distribution. In a few years more we will have ten times as much fruit as now, and it is necessary that we combine to increase the demand; as a very important part of the marketing, I would encourage the further investigation and application of cold storage; with this aid our marketing period can be more than doubled.

Insect Pests.—The *Icerya purchasii*, or fluted scale, has assumed very alarming proportions in the vicinity of Santa Barbara. There is nothing practically being done to eradicate this pest beyond the city limits. Our community does not comprehend the danger that awaits them. Some radical measure should be adopted to arrest the spread of this insect. I trust there will be some report made of the experiments with chemical gas in Los Angeles County. I do not wish to be considered an alarmist, but I beg to call your attention to what has been done in New Zealand regarding the rabbit pest. I quote from Consul Campbell, of Auckland, volume 88, page 150:

> The rabbit pest is the greatest evil that has afflicted the Australasian colonies, and perhaps no greater evil has ever come upon any country. To eradicate it from New Zealand has been the constant aim of the government and people, and the ways and means devised and put in operation to this end, have been numerous and ingenious. A Rabbit Department has been established in the government, with a superintendent in charge, local boards have been created, and private enterprises set on foot, all having one common object in view—the extermination of the rabbits. The sheep farmers of New Zealand were principally from England, and were fond of the ways of the old country, and it is said that rabbits were introduced for the chase—a popular amusement of the Old World. But it is of little consequence now, as to why or how the rabbits were introduced; it is certain that they came. They were brought from England. Scotland, and from Tasmania, and were turned loose upon the country. There were several kinds, the silver gray, the silver brown, and now and then would be found the black and white furred, but all belonged to the great rabbit family, and were destined to be seen and felt in New Zealand. When it is considered that rabbits breed from six to twelve times a year, the enormous increase that came from the rabbits first introduced is not surprising. It is certain that nothing could so overrun a country since the locusts of Egypt. It is difficult to estimate the great damage done to this young colony by rabbits. They have eaten out the ranges, so that the capacity for maintaining sheep has greatly lessened. The loss has been immense, running up into millions. At the Australasian Stock Conference, held in Sydney in October, 1886, it was shown that the carrying capacity of the land had been reduced a third, and the weight of the fleeces had decreased from one pound to one pound and a half each fleece. The lambing percentage had decreased from 30 to 40 per cent, while the death rate increased from 3, 4, 5, and 6 to 10, 11, 12, and 13 per cent. In 1882, what is known as the "Rabbit Act" became a law. Since then the government has expended annually $35,000 on the government lands alone, and that it was estimated that $1,256,000 was expended annually by private individuals. During the last eight years there has been expended the sum of $12,000,000, and a very much larger sum from the beginning of the warfare.

We have quite frequently of late read accounts of rabbit drives in the San Joaquin, which have been attended with considerable sport, people going from long distances to enjoy the fun.

It is not my desire, nor do I wish to be understood as underestimating the rabbit plague in New Zealand or in the San Joaquin, but I do not hesitate to predict that the *Icerya* in California, unless soon arrested, will be worse than the rabbit plague in New Zealand. You cannot drive it, there is no sport or fun connected with fighting it, but on the contrary, every one going into badly infected districts will turn away with disgust.

In the last report of Professor Riley on this insect, in Bulletin No. 15, page 32, there is an article by E. J. Dunn, published in Melbourne "Argus," August, 1886, as follows:

> I desire to call attention to a species of *Coccus* known as *Dorthesia.* This destructive pest was first observed on the island of Bourbon. Thence it spread to Mauritius, about twenty-five years since. In Mauritius it destroyed the orange and lemon trees, many of the ornamental shrubs and acacias, and wrecked most of the beautiful plantations and shrubberies.
>
> At Port Luis it still exists in loathsome masses on the handsome talipot palms. About twelve years ago it was noticed for the first time in the Botanical Gardens, Cape Town, and most probably arrived there from Mauritius with plants sent to the Botanical Gardens.. During the first summer it spread about three miles into the suburbs, along the railway. Its fearfully destructive character now became evident, for the orange trees, the Australian wattles, the pettosphorums, and the blackwoods, became loaded with this disgusting parasite, and the trees slowly but surely succumbed to its attacks.
>
> All trees of the orange kind, such as lemon, citron, shaddock, etc., proved especially suitable food for the *Dorthesia,* and once a tree became infested no amount of syringing or washing prevented its destruction.
>
> The disastrous results of its arrival at the Cape are all too evident. Formerly in Cape Town itself, and throughout the suburbs, the orange tree lent a charm to the gardens that no other tree could give, and in the Western Province orange growing formed a most important source of wealth, many farmers netting several hundreds a year from their orange groves. Some of these groves, planted by the Huguenots and their descendants, were of great age, and besides being profitable, were objects of great beauty. Those of the Pearl, French Hock, and Wagenmakers Valley, were especially famous.
>
> To-day this is all changed, and except for a few dead stumps, these fragrant groves, and this valuable asset in the country's wealth, have disappeared. Not so the *Dorthesia;* it is still advancing steadily, and leaving destruction in its wake, and will continue to do so as long as suitable food is within reach.

Now, my fellow-citizens, will you adopt some radical measure to arrest the ravages of this pest, or remain inactive; and, sooner or later, resort to the measures adopted by the people of Cape Town—fire and devastation?

The *Coccus oleoa* or *Lecanium oleoa*, commonly known as the black scale. No new development since report made at the Santa Rosa Convention. The rainstorms this winter made it impossible to get on the ground during the months of January and February. No other insects, excepting the above, have made their appearance to create alarm, so far as I have heard.

Fruit Unions.—There is no branch of the business that requires such united efforts as the distribution. Without fruit unions we cannot make a financial success. We cannot grow too much fruit, if it is properly distributed. The shipping of ripe fruit must not be in over quantities to any one market, but in such quantities as will be eagerly taken up for immediate consumption. Every market that will take one carload must be sought out. Trainloads can be divided at the Missouri River, and from there go to the place of destination by the most direct trunk line. It cánnot be managed with success if each individual fruit grower undertakes to ship his own fruit. It must be from a central office, where a careful record is kept of fruit demands in every market, and shipments directed from that office. The quicker fruit growers realize this fact the better. Trees are planted every year by the million. The fruit product will be enormous, and if we do not have the knowledge of distribution perfected, serious losses must result. The drying can be carried on with the ripe fruit shipping; in fact, this is the safety valve of the whole business. Ship all the ripe fruit the market will bear, dry the rest. The central office ought also to manage the dried fruit. There is no reason why any market should be overstocked with dried fruit. A suitable warehouse can be obtained, where advances can be made on dried fruits, and thus relieve the necessity of forcing sales. Our knowledge as to growing fruits is well advanced, we are, to a certain extent, well informed, drying and canning the same. The kinds, and varieties, and localities the same. The manner of packing has almost reached perfection, so that we are now in the advanced stage of discussion on these points.

The sulphuring, in the process of curing or drying fruit, was denounced in quite an animated discussion at the Santa Rosa Convention. It was claimed by some that there was danger of poison, from others objections were made from a moral standpoint. The remarks, however, were mostly made from statements that were without foundation in experimental facts. I have taken some pains to investigate what does result from the fumes of sulphur. I give below the statement of an analytical chemist of Philadelphia, a warm personal friend, to whom I wrote for information:

> Sulphur, when burned, combines with the oxygen of the air, forming sulphurous acid, a combination of one of sulphur with two of oxygen. It is a gas, and passes up among the fruit practically unchanged. Sulphurous acid is further oxidized by the action of air and moisture, forming sulphuric acid, a combination of one of sulphur and three of oxygen. This last process is, however, slow, unaided by stronger oxidizing agents. The quantity, therefore, formed in the process of fumigating would be very small and hardly appreciable, and what little would be formed would enter into combination with the fruit and not be in the free state. The effect of sulphurous acid on vegetable and animal matter is manifold. The changes that concern your present inquiry are as follows:
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> *First*—Bleaching, caused by the deoxidizing of the coloring matter contained in the fruit. In this action, the sulphurous acid combining with the oxygen of the coloring matter forms sulphuric acid, which combines with the vegetable matter of the fruit.
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> *Second*—Sulphurous acid has the quality of combining with nitrogenous organic compounds (albuminous bodies) contained in the fruit and preventing the decomposition of these easily decomposed bodies, thereby preserving the fruit in an unaltered condition. Sulphurous acid is therefore an antiseptic. Furthermore, the presence of a small quantity of sulphurous acid in the fruit aids in its preservation by preventing the action of par-

asites. In fine, the presence of sulphurous acid destroys spores and prevents the formation of fungi, thereby checking putrefaction and fermentation. The process of putrefaction is a complicated one; it may be considered as a slow combustion, commencing when fungi forms on the surface with sufficient access of air. The fungi appears to transfer the oxygen of the air to the body; oxidation takes place, converting the elements of the body into carbonic acid, water, and ammonia. By alcoholic fermentation the sugar of the fruit is split up into carbonic acid and alcohol. I have examined some dried fruit from California, with the view of determining whether any free sulphuric acid was contained in the fruit. The result of my examination proved the entire absence of free sulphuric acid. There was a fraction of one per cent of sulphuric acid in combination with the fruit amounting to only .05 per cent. I am of the opinion that the fumigating process, instead of being injurious to, or leaving any poisonous substance in, the fruit, is, on the contrary, beneficial, improving the quality of the fruit by preventing the formation of substances more or less injurious to health.

It is evident to my mind that sulphuring English walnuts, unless done with great care, will injure them. The two lobes in more than half the nuts are not so close but that the fumes enter and seem to unite with the oil of the kernel, so that this contact will cause them to become rancid in a few months. With the almond there does not appear to be any danger.

Freight Rates on Fruit.—The Chamber of Commerce appointed a committee to act in conjunction with a committee appointed by the California Fruit Union, to obtain the best possible rates from the railroad companies. The fruit growers at the Santa Rosa Convention also appointed a committee to act with the above committees. Our committee was composed of James Bettner,* George F. Hooper, and S. J. Stabler. I recommend their continuance.

What to Plant, and What to Grow.—I refer to an essay of Felix Gillet, dated Nevada City, December 11, 1887, published in the "Rural Press and Pacific Fruit Grower."

Protection of the Fruit Industry.—The Mills Bill now before Congress puts on the free list oranges, almonds, and walnuts, and reduces the duty on raisins and prunes. I recommend that this Convention respectfully protest against any changes in the present tariff duties, so far as it affects the fruit produced in California. The duty on almonds is 5 cents per pound, walnuts 3 cents, oranges $1 60 per one thousand. As I am a large grower of almonds and walnuts, I seriously object to any reduction in the duty. The average net price that I have received for the past five years is, for almonds, 10.9 cents per pound; for walnuts, 8.10. Presuming there should be a decline equal to the duty, I should at once root out my almond trees, because there could be no profit at these reduced prices. Was it even probable that by the reduction of 5 cents a pound that our people who purchase the nuts would continue to save this amount on what they purchased, there would be some reason for the reduction; but on examination, I learn from my former agent in San Francisco, who was in the shipping business, and who received consignments of these goods, that the lowest price he ever received for almonds was 22 cents. During the first years of the California production the uniform price was 25 cents. As soon, however, as more was produced than our home market would take, a rapid decline to less than one half said price took place. They have been sold as low as 11 cents. Remove the duty, and European producers would drive us out of the business, and then put up the price to former figures; so that reducing the duty means bankruptcy to the producers, and higher prices to the consumers. I have taken some pains to investigate the value of labor, or the prices paid for labor, in countries where we have competitors, or may have competitors:

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* Deceased soon after.

West India Islands.—Barbadoes, Consul Reed, in volume 86, page 248, gives the price of 20 cents per day for men, and 15 cents for women. Antigua, Consul Jackson, in volume 69, page 160; men, 20 to 24 cents; women, much less. Guadalupe, Consul Bartlett, in same volume, page 163; men, 22 cents; women, 18¾. Cuba, Consul Pierce, volume 65, page 267; men slaves, $3 per month; free men, $4 25. On the western end of Saint Domingo, where I lived and did business for a period of ten years, and was for a time joint owner of a sugar plantation, we paid men 16 cents; women, 12 to 14, and they boarded themselves.

Italy.—Consul Touhay, volume 69, page 123; men, 120 francs per year, equal to $22 50, with some perquisites which are estimated by the same Consul, page 124, to be worth from 40 to 60 francs a year, or about $3, making but little over $25 for a year's work.

Near Rome, Consul Alden, volume 76, page 120; 20 to 40 cents, not including board.

Catalonia.—Consul Scheuch, volume 70, page 243; 40 cents per day.

Marseilles.—Consul Mason, volume 70, page 215; $5 to $9 per month; $7 would be a fair average.

Morocco.—Consul Mathews, volume 69, page 184; 5 to 20 cents per day.

Hawaiian Islands.—Consul Putnam, volume 69, page 140; men, $9 per month; women, $6.

I might pursue this investigation to much greater length, but do not consider it important to do so. I will, however, state that about the same rates exist on the west coast of South America, and less rates from Mexico to the Isthmus of Darien, or Panama. One other fact, however, I wish to state, although not pertinent to the fruit industry of California. Consul Mason, of Dresden, in the volume entitled "Labor in Europe," page 16, writes:

> An important factor in the labor of Germany is not inquired of in the circular, viz.: the labor of dogs. I have heard it estimated that women and dogs harnessed together do more hauling than the railroads and all other modes of conveyance of goods united. Hundreds of small wagons can be seen every day on all the roads leading to and from Dresden, each having a dog for the "near horse" harnessed, while the "off horse" is a woman, with her left hand grasping the wagon tongue to give it direction, and the right hand passed through a loop in the rope, which is attached to the axle, binding her shoulder; thus harnessed, woman and dog trudge along together, pulling miraculous loads in all sorts of weather.

I mention this merely to show the difference between our American system and the system of some other countries. We quite frequently hear of syndicates being formed to purchase large landed districts in Mexico for the purpose of orange growing. Not at $1,000, $1,200, to $1,500 per acre, as at Riverside; or at $1,000 per acre, in the San Gabriel Valley; or at $500 per acre in Goleta, this county; but $1 or less, with the most favored spots at less than $10 per acre. There is not only this difference in the cost of land and the price of labor, but the command that those governments have over the laborers. Consul Herring, of Honduras, Central America, volume 82, page 288, writes:

> A strike was attempted once; the strikers were hunted and arrested by soldiers or policemen, under orders from the government authorities, given a sound flogging, and sent back to their work.

Rather a summary way to solve the "great problem," yet it worked like a charm.

As to the condition of wage workers in this country, I repeat from my opening address at Santa Rosa: "That in twenty years agricultural implements have displaced 50 per cent of muscular labor, the productive area more than doubled, and that notwithstanding this displacement of manual labor, wages have increased 60 per cent. That the necessities of life, as well as the luxuries of civilization, are at the lowest prices in our history."

A few words more and I will close. It is now about seven years since the creation of the State Board of Horticulture. I had the honor of being a member of the first Board, and was present at the first meeting. When I look back to that period, knowing the crude state from which we developed, the difficulties we had to encounter, and our own inexperience during the first years of our organization, it is with feelings of pride that I appear before you to-day. At that time fruit growers were groping in the dark, their operations were mere experiments, the results uncertain. To-day there is no uncertainty amongst the intelligent fruit growers, many branches of the industry are now a science well mastered. I venture the assertion that nowhere in the world is the business so generally and so well understood as in California. The dissemination of important knowledge, the progress made, has reached the most isolated fruit gardens, as well as the most princely orchards. Fruit growers vie with each other to discover new facts, and to disseminate them; we are united, our mutual efforts have secured for us in the past year a success beyond our most sanguine expectations. I do not claim this credit on the part of the Board; all interested fruit growers have contributed; it is the result of our united efforts.

The Board has been subjected to the most stinging criticisms, and, very possibly, deservedly so. But what other organization, State or otherwise, can show better results? We have given our time and our money almost without compensation. I have served for seven years to the best of my ability, devoting much of my time, with considerable money, and think that I should be relieved and some other put in my place.

Ladies and gentlemen, members of this Convention, all these questions are submitted to your consideration.

ADDRESS OF WELCOME.

Hon. Russell Heath, of Carpenteria, was introduced by the President, and delivered the address of welcome, as follows:

Ladies and Gentlemen: In considering agriculture and horticulture in Santa Barbara, it will be necessary to speak of the early efforts of that devoted body of men, who came to the coast under the auspices of the Catholic Church, particularly protected and encouraged by the King of Spain, who then claimed this vast territory. As a body of missionaries they came to civilize the Indian tribes; but their great distance from their own country rendered it necessary for their own support, and the support of their converts, that the land should be cultivated. Not content with the ordinary cereals for bread and food, the habits and tastes acquired in their own favored Spain induced them to try the choicest of the fruits of their own and neighboring countries; to these wants, necessities, and desires, we are indebted for the introduction of the pomegranate, fig, date, apple, pear, grape, orange, lemon, lime, olive, and the nut-bearing trees of the Mission gardens. Here it was that wheat was cultivated and manufactured into flour for the use of the different parts of the coast. From the propagating gardens established here were distributed the trees, vines, and shrubs, to other mission establishments; here the sheep were cared for, whose fleeces were manufactured into clothing and blankets for the priests, converts, and soldiers, stationed for their protection. When we consider that this occurred one hundred years ago, agriculture and horticulture can hardly be said to be in their infancy; and when we consider that at one time this Mission had under its care and instruction three thousand Indians, we must conclude that their operations must have been conducted systematically, and on a grand scale. Everything had to be produced, houses built, animals raised and subjected to toil, implements of every description manufactured. Am I saying too much, then, when I say we are greatly indebted to those missionary priests for their experiments in this new and untried land?

These things, great though they were, were destined to have an end. Revolution, the destroyer of civilization, came. The Spanish of the Americas declared their independence from Spain. The missions were despoiled of their hard earnings, and left without means of supporting themselves or the Indians. All sank into poverty together. Thus things continued, until fortune finally placed our own republic in possession of our Golden State. Some time was spent in mining for the precious metals; but the ever restless Americans soon learned that in the soil was to be found what in reality would make California one of the brightest of the American constellation. Under this new order of things, Santa Barbara's first Agricultural and Horticultural Society was formed in 1856, with a membership, if my memory serves me right, of about twenty-five, and James Ord, now stationed in Arizona, as its first President. But few of the old members still remain. From that year dates this new era in agriculture. Orchards and vineyards commenced to be planted. The thread dropped by the mission fathers was taken up by the American settler. All of the choice fruits of our own country have been experimented with. Europe, Asia, Africa, and the islands of the sea, have been called upon to increase our store. You will be able to judge with what success this work has been prosecuted when you examine the exhibition of the society. Remember, this is not the time of year when we have our fruits fresh, and in perfection. Such as we have, we welcome you to. In the name of the Horticultural Society, I welcome you to our society, city, and county. We claim no superiority over our neighbors of other counties. We are striving to keep pace with others. The laggard has no place with us. We indulge the hope that you may see enough in our county to please and interest you, and when you shall have returned to your distant homes, that some slight recollection may remain of your brethren in horticulture in Santa Barbara County. Again, I welcome you.

VICE-PRESIDENTS.

The President then announced the next order of business to be the election of two Vice-Presidents, and an Assistant Secretary.

On motion, Mr. H. C. Ford, and Mr. Edward Ivison, of Santa Barbara, were elected Vice-Presidents by acclamation, and Mr. A. E. Putnam, of Santa Barbara, Assistant Secretary.

THE CULTURE OF THE SOFT-SHELL WALNUT.

Essay by Joseph Sexton, Goleta.

The culture of the soft-shell walnut as practiced by me is the same as for the common nut and all stone fruits. The seed should be planted in beds during the month of January, and covered about one inch deep, and kept moist, but not wet, until they germinate, which will be in about three or four weeks, according to the temperature at that time.

As soon as they crack and show the sprout, they should be transplanted to the nursery rows, four and one half to five feet apart, and six inches apart in the row. They will grow the first year without irrigation six to twelve inches, and with irrigation six inches to four feet; the second year from four to eight feet without irrigation, and about the same with it. I cultivate all without irrigation, and think they make a better tree to plant where irrigation is not to be practiced.

The best aged tree to plant is two years old; not that I think the age makes any difference, but the trees at that age are of a size that they can be seen, and no danger of getting damaged while cultivating. In careful hands, I believe one-year old trees as good or better; and, perhaps, it would be better still to plant the seed where you want the orchard tree to grow; but if planted in this way, great care must be taken for two years in cultivating, that they do not get trodden down and the tops broken off, which makes the orchard uneven and unsightly.

When planting two-year old or large trees they should be selected, planting the largest trees first, and keep on doing so until the orchard is finished. By doing so you can get trees of equal size together.

Some say it will not do to plant the seed where you want the tree to grow; that it must be transplanted, and the tap-root cut to make it fruit. I have tested this claim and found it a fallacy, and find nuts planted alongside of one-year old trees all have proved prolific, and are larger trees than those one year older. If this theory were true, I think the gopher would attend to the root pruning generally, and we should feel thankful that the gopher, or some other rodent, struck the tap-root of the first walnut tree.

The soft-shell walnut should be planted in orchard form, forty by forty feet. It is more upright in its growth than the common walnut, and will do as well forty by forty feet as the hard-shell will fifty by fifty feet.

Low-growing crops can be cultivated for several years in the walnut orchard, until they commence to fruit. Beans and squashes are preferable to potatoes or root crops, as those attract the gopher, who is very fond of the walnut roots.

The soft-shell walnut commences to fruit at six years old from the seed, and some have been known to fruit as young as the fourth year. My trees have produced full crops each year for the past fourteen years. The hard-shell commences to fruit about the ninth year, and bears full crops alternate years. The soft-shell is not as strong a grower as the other walnut; it being so prolific retards its growth, and at the same age—taking a number of years together—it will not produce as much fruit per tree as the hard-shell variety, and at the same price it would not be as valuable a tree to plant. But the trees can be planted closer together, and the price can be made so much more that it will be the most valuable tree to plant.

The price is greater at this time, and when there are enough produced to compete in the market, there will be as much difference in price as there is in the hard and soft-shell almond to-day. I have sold the most of my soft-shell walnuts each year for seed, and have offered but few in the market, and where I have the price has been 13 cents. The hard-shell has ranged during the last ten years from 7 to 10 cents. If we had as many Santa Barbara soft-shell walnuts to put on the market as we have of the other varieties, I think the price would be nearly double and quicker sale. It is a superior nut, and when better known will be pronounced so by all. The kernel is white, and better for confection and for all other purposes. The shell is thin, rendering them easily broken by the hand, at the same time strong enough to bear transportation to any part of the United States.

The origin of this nut may be of interest to this Convention, and it is as follows: The winter of 1867 I bought in San Francisco a large sack of what they called English walnuts. I cannot say whether they were mixed or not. I had but little experience with the walnut previous to this. I raised about one thousand trees that season, and planted two hundred of them the following spring, in orchard form, at Goleta. Sixty of them proved to be the soft-shell variety. The balance I sold at one, two, and three years of age; part of those proved also soft-shell. This walnut, like all others, should be planted in deep, rich, sandy soil to insure the best results. The soft-shell is a little later starting in the spring than the common nut, and blooms about ten days later; and I have expected it would come true from seed, but I find they sport some; yet, at the same time, I have found none that deteriorate, and all that have come different I believe to be an improvement. I exhibit some of both varieties for the inspection of this Convention.

I planted twenty-four trees raised from soft-shell nuts; twenty-one came true to parent tree, and three made a much stronger growth, and commenced fruiting at the age of six years, same as soft-shell, and produced the improved nuts. I have not had time yet to test their bearing qualities, they having fruited but two years. If they should bear full crops each year, as the soft-shell does, and the tree a more rapid grower, even if the fruit does not prove superior, they will be considered an improvement.

The walnut wants but little pruning, and I cut none but those limbs that run down and are in the way of teams while cultivating. I prop thoroughly while the trees are heavily laden with fruit and foliage, and they should be kept up to avoid cutting. If limbs have to be cut off on the upper side where water is liable to collect, they should be waxed, as the walnut limb is generally hollow, and water enough may collect to rot the limb.

The soft-shell ripens a little earlier than the common nut, and they both vary somewhat according to the season. We generally commence to pick on the tenth to the fifteenth of September, and gathering lasts a month to six weeks. There are different modes of gathering; some clean the trees at once, and others go over them several times. I pick what has fallen without knocking. I then tap those limbs lightly on which the nuts are ripest, and the third time over I aim to clean the trees. The walnuts are picked up and put in sacks and barrels, so as to be easily handled and hauled to a sunny place to dry, and should be placed on elevated platforms made of narrow boards, with spaces of one fourth of an inch between each board. The platform should be about eight feet wide and forty feet long, or as long as two men can handle a canvas to cover the beds, which should be done every night the dew falls.

The nuts should be stirred in these beds once or twice each day, and with favorable weather they will dry sufficiently in three days, and are ready for market. I have always dried my walnuts by the sun, and they have given good satisfaction, and for small orchards, I think it is the cheapest and best way. Some dry by evaporation, and claim it is preferable to the sun; that it sets the oil quick, and prevents the nut from becoming rancid. Others claim that it makes them so; but be this as it may, those having large orchards cannot depend on drying all by natural heat, and the drier will have to be used, even if it is not so good for the fruit.

The walnut is marketed in sacks, the greater portion in what is called walnut sacks, and holds about one hundred and twenty pounds; others use the common barley sack, holding sixty-five pounds.

THE HARD-SHELL WALNUT.

Remarks by Mr. Russell Heath:

Mr. President, there is a great diversion of opinion among walnut growers, with regard to the culture of the walnut. I believe I am the first man in this county, outside of the mission priests, who attempted the culture of the English walnut; I commenced it in 1858. I listened, with a great deal of attention, to the essay of Mr. Sexton, to find the history of the soft-shell walnut. In 1858, there being no trees in California of the walnut species to be obtained, I procured of Mr. Wolfskill, in Los Angeles, the nuts to plant the first nursery in this county. There was no such thing known in California then as the soft-shell walnut. Of the thousands of trees that I produced in my nursery, I raised one tree only that differed from the original stock—walnuts having always been understood to be true to its stock. Those trees were planted in the fall of 1858, consequently the trees were started in the winter of 1858–9. When Mr. Stowe came here, in the spring of 1873, he applied to me for walnuts to plant in nursery, as he could not obtain sufficient trees to plant the ground that he was desirous of planting. I furnished Mr. Stowe with a large quantity of nuts. I had the previous year placed walnuts in the San Francisco market, and very likely it was from that lot of nuts that Mr. Sexton obtained his first soft-shell walnuts, because the first soft-shell walnut was produced from a nut from the Wolfskill orchard in 1859, in my orchard, and I was not aware of the existence of that soft-shell nut, until my attention was called to the fact by Mr. Stowe of these trees in the nursery, produced by himself from seed obtained from my farm, that there was one tree different from the other trees, and he desired to know how it was, that there was so much difference in walnuts, where the seed all came from the same farm. At that time I was not aware of the existence of a bearing soft-shell tree in my orchard, and wrote Mr. Stowe that at my first convenience I would go out to his orchard and examine those trees. I did so, and found, to my surprise, the soft-shell walnut, a walnut that I was not familiar with, that I never had noticed in my own orchard at all. We watched that tree, and that same fall, in gathering the fruit in my own orchard, my superintendent called my attention to the existence of a tree, which he said was different from all the others, and wanted to know if he was to put that fruit with the other fruit. I said, no; don't put it in if it is different, as I wanted to examine it, and went down there and saw by the leaf that Stowe's was a soft-shell walnut, and that the soft-shell walnut undoubtedly came from the seed that I had sold to Mr. Stowe.

Now, my belief is, that the soft-shell walnut was a chance fruit obtained from the seed from the Wolfskill orchard in Los Angeles; because, before that time, there was no such fruit. So much for the soft-shell walnut. It may, or may not be true, that the seed obtained by Mr. Sexton from San Francisco may have been from that which I had in San Francisco for sale, as I had seed in San Francisco for several years for sale, and being one of the first experimenters in walnuts, I had no trouble in selling the fruit.

With regard to the planting of the English walnut, it is a question that I approach with a good deal of delicacy, especially as I am led to differ from our President, a gentleman whom I esteem as high as any man in the State, as to the poisoning of walnuts. My place of two hundred acres was one mass of oaks, and there is not one single acre of the one hundred and eighty acres now in walnuts, but what had oaks that would cut from four to fifteen cords of stove wood; and yet I never lost a tree planted among the oaks. Now, whether it is poisonous in the soil occupied by Mr. Cooper's orchard, and not in the Carpenteria, is a question that only the analyzation of the soil can prove, but in my locality the oak is not poisonous to the young walnut. The great mistake, in my opinion, in the raising of the walnut is that a suitable locality is not first obtained. I saw, as early as 1854, that California was destined to be what she is only now realizing, one of the richest States of the Union, and that in the soil was the secret of her success to be. Realizing that, and being ignorant of farming—for I never had held a plow in my life, never had lived outside of large cities—I looked from San Luis Obispo to San Diego, seeking for lands where I might plant the walnut, the almond, and the grape. I first went to Ventura County, and, after a year and a half, found that I had made a mistake in my selection; and, looking around other localities, I found in the Carpenteria a dense jungle, such as could not be found outside of Santa Barbara County, and said to myself, "If this will grow this jungle it will grow the walnut, the almond, and it must grow the grape," and I cleared that land at an expense of from one to one hundred and fifty dollars per acre, and I planted the orchard that I now have. With regard to the soft-shell walnut and its profit and the hard-shell walnut, so called, I claim that no living being can tell the difference by the kernel of the two nuts. A few years ago there was a company of eastern people visiting our city, looking around. A good deal of talk had already been created with regard to the soft-shell walnuts. As I was getting fancy prices, I didn't object. I got as high as 50 cents a pound from nurserymen who were making a big thing out of the soft-shell walnuts. I put out a nursery and planted four hundred trees, and I have got all the soft-shell walnuts I want, and when one dies I don't want another; and my objection is this, that they are too difficult to ship, too difficult to handle, too difficult to market. I say that no man can tell the difference of the quality. I was firmly of that belief, and I am firmly of that belief to-day. There were ladies and gentlemen present at my table, partaking of a dinner, and there were hard-shells and soft-shells in the same dish, because I made no difference in selection. They said, "Yes, these are very nice walnuts, but I always prefer the soft-shell; they are much higher flavored, a much better nut." "Well," I said, "that is simply a difference of opinion, some might think the common walnut equally as good," and while conversing I used my nut-crackers, because I didn't want them to see that I could crack my nuts with my fingers, which I could do with all the nuts on the table, and I cracked the soft-shells and the hard-shells, and placed the two in dishes by themselves and passed them around to the ladies and gentlemen present, and asked them to kindly tell me which was the hard and which the soft-shell, which is the higher flavored of the two. The test was made, and two ladies announced that they had made the discovery; they declared that no such nuts could ever be raised on a hard-shell tree. I had the shells and kept one. My wife was looking at it. She thought I was going to try the soft-shell walnuts, because I contended that there was no difference. I said, "Which do you call the best nut?" They said, "Why this; there is no mistake about it; there can't be any mistake." And, lo, and behold! they had selected the hard-shell walnut. And that is the difference, simply fancy.

Now, in the distance of planting the soft-shell walnut, and I must refer a little to Mr. Sexton's essay with regard to transplanting trees. I don't know much about this thing, but I have experimented, and that is the only way I had to learn. I didn't know anything about horticulture, I had everything to learn from books and experiments, and all the knowledge I have was by books and by experiments. I commenced transplanting trees in my nursery at one year old; each year I renewed my nursery rows, planting each year so as to enable me to have trees for my own land, which I was obliged to clear in order to prepare it for the orchard. I planted after the first year, I planted after the second year, and continued that planting year by year from three different nurseries of different ages; when I arrived at the ninth year of the planting, my trees had then been in bearing one year in the nursery, and now this is the result as my experiment goes. The trees that I planted out one year will bear its fruit the seventh year. Now, with regard to the bearing of the walnut in four and six years, and seven years, let me say this right here, that in its native country Persia, it bears at eight years, and never was known to bear in less than eight years. I know that California is excellent; I know that it excels in many respects, but I say Persia is good enough for me; eight years for the walnuts is as soon as I ever had them in my orchard from the seed. I planted the one-year old tree, the two-year old tree; I lost the two-year in nursery, because I say that my experiments prove that two years is an unnatural time to transplant the walnut. I will tell you why. The first year the walnut makes from three to seven inches, and I should advise any man who desires to set out any orchard, especially on the coast, to buy no irrigated trees, because irrigation is not necessary here. The second year the tendency of the walnut is this, and there are two periods that the walnut ought not to be transplanted, that is the second, and after the fifth year; the root starts the second year and makes a partial growth, and then it divides itself between top and root.

I will ask any walnut grower that has watched his nursery, if that is not correct? The walnut will start and grow in root first without starting at the top until it has made a certain period of growth and then the root grows if not forced. Now, I want to emphasize that matter of forcing trees, because I can take a fig and make it grow ten feet from the cutting by forcing it; I can take a walnut and make it grow ten feet the second year, but I say that is an unnatural growth and it ought not to be indulged in. The second year I say, then, is dangerous; it is the period between the top and the root, and when you take it up you destroy that growth; the third year, it makes top alone, comparatively no root; it is then that your little tree, twelve inches high, grows up to the height of six to twelve feet. It is the top that is making that year, and, of course, you do not desire to transplant a tree that is all to top and not to root, because when you take it from the nursery rows, you must allow that tree to go down and make the root first, before it can make the top. After the third year you can transplant it with safety. Why? It has made its top; the fourth year its tendency is to root and not to top, because on the fourth year it makes its spurs two inches on the side of that growth of the third year. The tendency of that year is all root, and if you want to transplant a young tree, then take up your three-year old tree and transplant it, and you will get your fruit then as quickly as the age of the tree will allow it to bear. After the fifth year the tendency then is not to make root; then is the time when those little branches, two inches long, send out the long arms to the distance of seven or eight feet; then it is that you want more care in your orchard than at any other time; then it is that your tender shoots, especially in exposed conditions, are liable to be cut upon the end by the frost; then it is, if you are in the interior, that one hot blast will kill the ends of your tree because it will have vigorous growth growing after the fifth year, and about the sixth, and the only remedy is then the knife, which any orchardist can tell when and where to apply, because, when the tree is touched by either cold or heat, you will see it by a little mark of black, and then use the knife below that black mark. I have never lost a walnut when I took that means of preservation. Transplanting trees, my experience is, that I never have had a nut from my trees that I transplanted from one year old to seven, without waiting six years. Mr. Sexton has raised them in four years; I do not dispute his word, I only state my experience, that I never have produced a walnut in less than eight years, except as I am about to tell you—in my experiments, remember that I made them from three nurseries, growing at three different periods of time—I transplanted my trees after they had passed the age of bearing in my nursery rows; of course, nurserymen can not afford to raise trees of that description, but a man who stakes his money and his time upon an orchard, can afford to wait. It takes time, and requires money, but no man can succeed raising a walnut without the expenditure of money and time.

I transplanted eight hundred eleven-year old trees, and did not lose one in transplanting, and last year I had fruit upon more than two thirds of those trees; two years ago I did not transplant, because the season was not favorable; this year I have transplanted six hundred trees more than twelve years old, and I will get fruit from those trees as sure as I am a living man—or perhaps my son will if I am not here—just as soon as that crop forms, because I cut the top entirely off at eight or nine feet from the ground, regardless of limbs. I cut the top square off, and some of my neighbors came and saw what I was doing. They said: "He is putting out hitching posts." I have a thousand out, and I would to God I had twenty thousand more, because those hitching posts are now bearing and putting money in my pocket; and so I say to-day, that I had rather give $10 for a tree that is nine years old than to give one cent for a tree that is four years old. I say there is money in it, because it costs me no time to cultivate in the nursery. One man will go through a nursery and cultivate a thousand trees in half a day; and if you place those trees in the orchard you are at great expense. Teams and men cost money. You can buy teams, and you can hire men; but I tell you that, even in California, with all its fruitfulness, you can't buy brains to drive those teams; that is our greatest curse; you can't buy brains; that is the trouble of every single orchardist who does not do his own work.

With regard to the profit of the English walnut—you need have no fear. Plant your walnut. You have an investment safer than anything in these United States. There is nothing that yields so certain as the English walnut; there is no odd year; there is no off year; you can hold your price better, and the money will flow year by year, as every orchardist that has his orchard in a good place will tell you, if he tells you honestly.

Mr. Cooper: I would like to know about the expense of transplanting a walnut tree, ten years old, from the nursery.

Mr. Heath: My plan in transplanting the ten-year old walnut tree is this: All the trees I have in my orchard I have raised myself, or under my direction. I place my men, when the season comes, in trenching on each side of a row, and dig down at least four feet, leaving the lateral roots at least two feet and a half on each side; mind you, the walnut tree is a tap-root tree, and only by cultivation, or lack of cultivation, may you force it to send out lateral roots. The principal root is the tap-root, and now I desire to say something with regard to the cutting of the tap-root. When the trees are ditched in that way early in the fall, in December, with a prospect of a fair year, for I never ditch a walnut until I have some pretty good assurance that we are going to have a pretty fair year, because the walnut requires a very rich, deep soil, and must be wet—we don't irrigate here, and we must get our rain from the heavens—then as I take up fifty trees at a time, I place my gang of men, may it be five, or ten, or fifteen, to digging holes, each tree, as it is taken up, never over twenty-five at one time, exposing the root. The wagon takes them in the field, the ground having been staked off carefully forty feet apart each way; the tree is laid down, the man digs a hole for the tree, measuring the roots; after the holes are dug I take, usually, two men to hold the tree, two men to fill, packing the dirt carefully around the roots—one man, generally my son, on one side, and another man that can do it carefully, lining them to keep them directly straight, as I desire my orchard to be perfectly straight; so it takes six men to transplant one tree. The expense of transplanting trees in that way is, of course, very much greater than transplanting small trees. Where the tap-root is cut off ten inches below the ground you simply take a spade and dig a hole, and a man goes and stamps up the ground to the tree—an unnatural, unreasonable way of transplanting any tree; no tree ought to be transplanted in that way. I think the expense of transplanting trees in the way I mentioned is about ten times what it would be for a three-year old tree.

Now, with regard to cutting the tap-root; I did not know anything about walnut culture; I was more indebted to these priests at the Mission than any knowledge I could get from books. I went to Sansavain & Wolfskill, who had been in the business for many years, but I tell you that the observation of the cultivators of the trees in Los Angeles was of very little use to me; they could not even tell me whether there were two blossoms on a walnut tree. When I found out that there must be two blossoms in order to bear its fruit, I wanted to know whether those two blossoms were on the same tree or on different trees. I went to Los Angeles, and propounded that question to Mr. Wolfskill and Mr. Sansavain (experienced men in the business); they said, "You are the most inquisitive man we ever heard of in our lives, never heard of such a thing here, I don't believe there is any blossom at all." I said, "Do all your trees bear, that is the question?" "Yes, they all bear." "Then, I say, they all have blossoms, and they all have two blossoms." I watched my trees when they came to bearing that year, and, lo and behold, I found the two blossoms which they had never noticed. Now, some wiseacre that thought he knew more of the cultivation of nuts than any other man in California, discovered in Los Angeles that if you cut the tap-root your tree would never bear, and that was published in the papers throughout the State. I said, "Here is a pretty kettle of fish again; I have cut all the tap-roots in my orchard, and I don't know whether I am going to have any fruit; I will see about this thing." They said that where the tap-root is cut, there the decay would commence, and an insect would attack the root and eat the life out of the walnut, and it would finally die. I determined not to be fooled much longer in spending more money, and took two men and went right down to my orchard. I could not make any mistake, because I had cut off every tap-root in the orchard. We dug down carefully by the side of the tree—I was going to be very careful about it—I had a very large magnifying glass, and took that with me, and after they got down below where the tap-root was cut, I got my magnifying glass and said, "Boys, you needn't use your shovels any more, I want to get at this thing with my hand," and took my glass and went down in the hole; I commenced digging like a gopher, and when I got down to where the root was cut, to my surprise there were two tap-roots, beautiful as could be, sent out from the place where the tap-root was cut. I examined five trees in that way, and each had two tap-roots, and I made up my mind that the Los Angeles men that had been writing about tap-roots were in a dream.

Mr. O. N. Cadwell, of Carpenteria: I commenced cultivating English walnuts nineteen years ago. I have raised trees from the seed, and transplanted all the way from a year old up to six, perhaps, and they have grown and done well, but so far as my experience goes, I prefer to move them at three years of age, or about that time; the best trees I have were planted at three years old. A part of my orchard stands where they are not replanted, and I can see very little difference than where they were transplanted at two or three years old. I am a neighbor of Mr. Heath, and am conversant with his planting of his trees; they are growing nicely and looking well, but at times I have had a little anxiety as to what the result would be. It starts close around where he cuts it off, and it will take some time to heal there. I have noticed on several there is a dry place, and if that heals perfectly well, and the tree is sound, it is all right, but I have thought to myself sometimes, if he had the heavy winds to encounter that they do in some places, when those branches reach out like the branches of the trees when they were two or three years old, perhaps they might break at that spot; otherwise, I have no fear, because the trees grow nicely as far as I have seen.

Mr. W. G. Klee: So far, I believe the success of walnut growing has been confined to the southernmost counties, including Santa Barbara, Ventura, and Los Angeles. I think that there are other portions of this State where walnut culture could be made very profitable. There have been a number of trees planted all over the State; I have met with them in nearly every county in the interior. The experience has been that seedling trees, raised from Los Angeles walnuts, do not succeed; they have a great tendency to be injured both by frost and heat. They grow very late in the season, and are caught by frost, and during the summer the tender shoots are injured by the dry, hot winds. Now, experienced men have seen this; among others, one of the oldest horticulturists in the State, Mr. John Wolfskill, on Putah Creek, some twenty-five years ago discovered that such was a fact, and he took and budded a few native black walnuts of the trees in his orchard, which had suffered with the common walnuts. These trees are now some twenty-five years old, and are as healthy, perfect looking trees as you can put an eye on; some of them are bearing well, others are not. I learned from him that those that do not bear were budded from trees that never had any nuts on, while those that do bear are from trees that show a tendency to bear. Seeing this, I have been urging upon nurserymen to propagate that stock, believing that the culture of the walnut could be extended very much. I know that a good many trying it have not made it a success, and that it is difficult to make buds take, but this season I saw in the Stockton nursery a number of young trees which have been budded successfully, and Mr. Clowes, the proprietor, told me that by doing the work very carefully, and taking out nearly all the wood from the bud, they had succeeded, and that it was considerable of a success, some 65 to 70 per cent of the buds had taken. I believe that it is in that way that walnut culture may be made to succeed where otherwise it would not. It certainly is worthy of further trial and experiment.

Mr. Lelong: Two years ago I thought I would try to bud the walnut on to the wild California stock growing in the mountains, and went up east of Los Angeles, to what they call the Puente Ranch, and from there we drove out twelve miles into the mountains. There I inserted over five hundred buds into the wild California nut. I am told this year there are some over fifteen feet high, and only two years from the bud. The way it was done is this: The English walnut has a great many spurs on the small limbs. I waited until the stock had leaved out, when the sap flowed freely. I cut the stock off, and took these spurs, cutting them as you do a bud, leaving to the bud a very large piece of wood; then that piece of wood was gouged out, leaving very little of the wood to hold the spur to the bud; it was inserted as a bud and waxed over. In about two or three weeks they began starting and made a very fine growth. Those that were budded with eye buds, as budding is commonly done, also did well, but not as well as those spurs, although I doubt whether it would be profitable on account of the squirrels—they take all the leaves off the buds.

Mr. Crofton, of Courtland: I have had very little experience in walnut culture, but some years ago I budded a black California walnut, and find that I made a success out of it. I merely inserted the buds in the usual way, as you would bud the peach or the plum tree. That was, I think, thirteen or fourteen years ago, and now it is a fine large tree and bears well every year. Mr. Lelong, when he was up there, noticed the tree, and everybody passing by is attracted by it, as it is budded some four feet from the ground, and below that the bark is black.

Mr. Lelong: There had been some question in San Francisco about the propriety of budding the English walnut on this stock, and it was thought that by so doing it would make the walnut much darker and the shell much harder. I sent to Mr. Crofton for some specimens, which he kindly furnished, and I made a test of them and could see no difference either in flavor or color.

The Convention then adjourned until the following morning at nine o'clock.

SECOND DAY'S PROCEEDINGS..

Santa Barbara, April 10, 1888.

The President announced the subject of the morning, "Insect Pests and their Extermination."

IMPROVED METHODS IN CHEMICAL FUMIGATION.

Essay by Prof. D. W. Coquillett, Los Angeles.

Mr. President, ladies and gentlemen: I have been requested to prepare a paper on the process of fumigating trees for the destruction of scale insects, and my apology for not producing a better one is, that its preparation was delayed until the last moment, with the hope that I might be able to give some definite facts in regard to the practicability of transmitting the gas from one tent to the other after the first tent had been allowed to remain upon the tree a sufficient length of time to prove fatal to the insects, but the necessary apparatus for making tests of this kind is not yet completed, so I am unable at present to give any facts in relation to the transmission of the gas.

The process of fumigating trees for the destruction of insects consists briefly in inclosing the tree in an air-tight tent, and afterwards filling the tent with a poisonous gas that will destroy the insects without at the same time injuring any part of the inclosed tree. The earliest account I possess of any attempt of this kind, is a copy of the specifications for a patent granted to Mr. James Hatch, of Lynn, Massachusetts, on the fourteenth of May, 1867. Mr. Hatch's method consisted in inclosing the tree in an inverted sack, and filling the latter with the fumes of tobacco, pepper, and other noxious substances, by the aid of a furnace and connecting pipe; but this method does not appear to have been very widely adopted.

Dr. A. S. Packard, who for several years held the position of entomologist to the Massachusetts State Board of Agriculture, writes me that he is not aware that this method has ever been used in any of the New England States, and I can find no reference to its having been used in any part of the States east of the Rocky Mountains, from the date of the Hatch patent up to the present time.

It appears, therefore, that all the attempts at perfecting this method have been made in Southern California.

In the earlier experiments the tent used in inclosing the tree was constructed in the usual round or circular form, with a rounded or dome-shaped roof, and was lowered down over the tree from above; it was found, however, that the apparatus necessary for this work, when operating on tall trees, was altogether too awkward or cumbersome to come into general use; to obviate this difficulty, an opening or doorway was made in one side of the tent, extending from the roof to the ground, and when this doorway was opened wide, the tent could be put on the tree without being elevated very much; after the tent is on the tree the doorway is closed by bringing the opposite edges together and wrapping them one around the other, and to facilitate this a piece of gas pipe is fastened to the tent on each side of the doorway, and extending from the roof nearly to the bottom of the tent.

Mr. H. K. Snow, of Tustin, proposes using a tent of this kind, only having two doorways instead of one, so that after the tree has been fumigated sufficiently, the tent can be passed forward off the fumigated tree, and upon the one next to be treated. He proposes operating the tent by means of an apparatus consisting of four posts fastened together at their upper ends, from which the tent is to be suspended, while the lower ends of these posts are to be fastened to two runners, like those of a sled, so that the apparatus can be drawn forward astride of a row of trees. This is a very simple arrangement, and one that almost any fruit grower can construct with his own hands and at very little expense.

Mr. John P. Culver, of Los Angeles, a civil engineer, and a very practical man, has recently constructed a tent for inclosing the tree, which, for simplicity of construction and ease of operating, is a great improvement upon anything of the kind ever produced heretofore. It is in the form of two half tents, which inclose the tree from one side, and consists, briefly, of two inverted U-shaped arches, fastened at one side with hinges to an upright mast mounted upon runners. The tent proper is in four sections, and is stretched upon these arches, so that when the tree is inclosed the sides of the tent will rest upon the ends of the branches. The inner surfaces of the two wooden arches, which are to meet each other when the tent is inclosed, are covered with a thick layer of felting, and the two arches are fastened together by means of a rope and pulleys. This apparatus is a great improvement upon the old way of letting down the tent over the tree from above, and I see no reason why it cannot be used upon the largest orange and lemon trees.

After experimenting with a great many different gases, I have found nothing superior to hydrocyanic acid gas, produced by acting upon a solution of potassium cyanide with sulphuric acid.

Much will depend on the comparative purity of the cyanide used, and while it is not necessary that this should be chemically pure, still it should not contain any visible impurities. One of the best tests of its purity is to pour a small quantity of sulphuric acid upon some of the dry cyanide, and if it evolves the gas in the form of a whitish vapor, the cyanide is sufficiently pure; but if it simply effervesces, without producing a visible gas, the cyanide will not answer the purpose.

The dry cyanide should be kept in air-tight packages, otherwise it will lose much of its strength. It is commonly sold in sealed tins, containing one and two pounds each, and should be allowed to remain in these cans until ready to begin operations.

For rendering the gas harmless to the tree, I know of no method superior to that of passing it through sulphuric acid. For this purpose the gas is generated in a closed leaden generator, furnished with leaden pipe leading into the top of a second leaden vessel containing sulphuric acid. The pipe from the generator should pass nearly to the bottom of this second vessel, and the gas will then be allowed to pass upward through the acid, and by a second pipe will enter the tent which incloses the tree; after this the air and the gas in the tent should be thoroughly stirred, and the tent be allowed to remain upon the tree about half an hour.

The acid, through which the gas had passed, can be used for generating the gas the next time, and fresh acid should be poured into the second vessel for the gas to pass through.

I will here briefly notice some of the objections that have been raised against the universal use of this method for the destruction of insect pests.

Firstly, as to the poisonous nature of the gas, and of the chemicals used in producing it.

While due care, in handling these poisons, should always be exercised, yet, with only reasonable care in this direction, no evil results will follow. When Professor Riley first advocated the use of Paris green for the destruction of the potato beetle, people in every direction loudly protested against the use of this poison, saying that its use would certainly result in the wholesale poisoning of children and farm animals, and by being carried by the plant to the tubers themselves, would thereby cause the death of every person who ate potatoes that had been treated with this poison; and yet at the present day no substance is more successfully used against manipulating insects than is Paris green.

Moreover, if the process of transmitting the gas from one tent to the other should succeed, as I believe it will, this will greatly lessen the danger of being poisoned by the gas, as compared with the present method of allowing the gas to escape in the air, as soon as the inclosed tree has been sufficiently fumigated.

It is also claimed that only a trained chemist can manipulate the production of the gas; but this is not true, since any person of ordinary intelligence can accomplish this quite as well as a trained chemist could. Of course this part of the work should not be intrusted to any and every person, but this is equally true in regard to the other methods for destroying insect pests, and I am sure your Secretary will agree with me, when I make the assertion that even the best washes that have ever been produced for the destruction of scale insects will, in the hands of careless and unexperienced persons, give only indifferent or unsatisfactory results.

In the matter of fumigating orchards, it would doubtless be desirable for certain persons to purchase the necessary apparatus, and then go from orchard to orchard, fumigating the trees, at so much per tree, just as, at the present time, the hay balers go from field to field, baling the hay at so much per ton. Already the cost of the apparatus for operating the tent has been very materially reduced; thus, the tent over the tree from above costs all the way from $150 to $300. I am informed that the cost of the Culver fumigator will not much exceed $100, while the apparatus suggested by Mr. Snow should not cost over $50.

The only real obstacle to the universal adoption of this method is the present high price of the potassium cyanide.

For this I am obliged to pay in Los Angeles from 80 to 90 cents per pound, which puts the cost of fumigating an orange tree, twenty feet tall by fourteen feet in diameter, something like $1 75 per tree. It has been the rule with every manufactured commodity, that when it came to be very extensively used, its price diminished in the same ratio, and we may confidently expect the same thing to happen in regard to the cyanide; but this is a phase of the question which I must leave to the fruit growers for their consideration.

Before closing I would like to give a little experience which I had in fumigating with tobacco. I had an upright earthenware furnace constructed, the interior of which measured about three feet high by eight or ten inches in diameter; this was constructed in such a manner that a Cumming's blower could be attached to it for the purpose of firing up the charcoal, and it was furnished with a pipe for conducting the fumes into the tent. I filled this furnace about half full of charcoal, and when this had been heated red hot, I threw upon the hot charcoal about four pounds of refuse tobacco stems, connected the pipe, and allowed the fumes to pass into the tent previously placed over a small orange tree; the tent was moved from the tree at the expiration of one hour, and it was found that all of the *Iceryas* were dead, as well as were also the black scales, *Lecanium oleæ*, and the soft scales, *Lecanium hesperidum*, but only a small percentage of the red scales, *Aspidiotus aurantii*, were killed, while the tree was uninjured.

Whether or not this method could ever be used against the *Icerya* on a large scale, I leave it to the fruit growers to decide; it is certainly much cheaper than fumigating with hydrocyanic acid gas, and almost every fruit grower could raise all the tobacco necessary for fumigating his trees, and at very little expense.

MR. COOPER: I should like to ask Professor Coquillett about the cost per tree in the application of the gas.

MR. COQUILLETT: Mr. President, in regard to this, I would say that I have only purchased the cyanide of retail dealers in Los Angeles, so that I could hardly give an estimate of what it would cost should it be obtained in large quantities. In Los Angeles, the price is about 80 cents per pound for the best grade of cyanide. The cost of fumigating a tree twelve feet tall by about ten feet in diameter ought not to exceed 60 or 70 cents; for a large tree twenty feet tall and fourteen feet in diameter, it would somewhat exceed $1 75, not counting the labor. If this method is adopted, some steps should be taken for obtaining the cyanide in large quantities and at a reduced rate, a much lower rate than we are obliged to pay when we get it at retail. There has been considerable trouble in getting the proper quality; some persons have used the poorer grade and have not made the success they would if they had had the best grade. I would therefore advise that only the best grade be used on all occasions.

MR. COOPER: I understand from the explanation that in the event of a company of two or three or more persons, as would be necessary to undertake this and make a special business of it, that the cost would be about $2 per tree.

MR. COQUILLETT: Not to exceed that.

Mr. Cooper: And would not be required oftener than once in two years.

Mr. Coquillett: Mr. President, about repeating the operation, of course, that would depend upon the thoroughness with which the fumigating had been done, and also whether the trees treated were in the immediate neighborhood of trees that were infested. I am strongly of the opinion that in isolated orchards, with either the red scale or the *Icerya*, one treatment would be sufficient for two or three years.

Mr. A. S. Chapman, of San Gabriel: I will say that the trees I treated with cyanide, I think killed all the insects on them, but you put the tent on the tree, and a great many are knocked off on the ground, also a number on the trunk of the tree, and they come up again and increase on some of the trees, until they are nearly as badly infected again; but the trees are very healthy and very free from the red scale.

I would like to say that at Riverside, a year ago, Professor Riley suggested a kerosene emulsion forced through the middle of the tree in a very fine spray, enveloping the tree in a complete fog, and he said, "We could apply that at a very small cost and very rapidly." It seems to me with our present tents, if we envelop the tree in tents, that then we can put this kerosene spray in the middle of the tree, and spray the tree from the center, having the tent on the outside, at a very small cost indeed, with either a kerosene emulsion or a crude oil emulsion; that is Professor Riley's idea, except that I add to it, putting the tent over the tree to make the fog more complete, because, if there is any one thing it should be tight. There is a great deal of prejudice against kerosene, and I think it is because we have used it in such quantities and allowed it to run off the tree until it hurts the roots. It collects right around the trunk of the tree where it runs down, and kills the bark right at that point, and then the tree dies. The great advantage of the fog would be that there would be no excess, it would not fall from the tree, it would be like a fog around the tree and hardly any would reach the ground.

A Delegate: Would you spray from the inside of the tent, or outside?

Mr. Chapman: I would have the pump and material outside, and have a pipe, and have the fine nozzle right in the middle of the tree, inside of the tent. I have sprayed some trees about three weeks ago, both with the kerosene emulsion, according to Professor Riley, and the crude oil emulsion, and it looks to me as if the crude oil killed the bugs better than the coal oil. They were very badly infested, and after I got through there were a good many crawling up from the bottom, and they have since all died.

Mr. Cooper: I should like to ask Mr. Chapman what nozzle or patent he used in spraying.

Mr. Chapman: I don't know which is the best nozzle; Professor Riley recommended the Bunch nozzle; I don't know; I have never seen it work. There are other nozzles; which is the best I do not know. I myself have always used the San José nozzle; it all depends on getting a perfect nozzle; in my own spraying I had a San José nozzle, and in the place of the little copper I had a leather with a very small slit, and I took my time and made fine sprays, for I was making a test of it. This material will cost, if you use crude petroleum, about less than a half a cent a gallon; but if you use coal oil it will cost you something like two cents a gallon; and five gallons of it would treat a tree that is twenty feet high and fourteen feet in diameter, which would cost, with the cyanide, about $1 75 for the material, and when applied would be about $2, and the kerosene would not cost more than 10 cents all through.

PARASITES.

Essay by W. G. Klee, State Inspector of Fruit Pests.

Ever since the magnitude and extent of damage, in particular to the citrus fruit industry, by the fluted scale, *Icerya purchasi*, became impressed upon my mind, I have, on account of the omniverous habits of the insect in question, become more and more convinced that it must certainly have formidable enemies in its native home, otherwise whole tribes of plants would be literally exterminated by it. I have thus far spent considerable time in trying to learn its native home, and to what extent it is kept in check by natural agencies in other countries. Professor Riley has also worked in this direction, and in my last report to the Board letters written on this subject, both to Professor Riley and myself, were published. Since reading the report of the well known English entomologist, Miss E. Ormerod, on the *Icerya*, I was much gratified in learning that in South Australia and in South Africa had appeared insects destined to check, if not altogether keep down, this terrible pest. In Africa it was the larvæ of a lace-winged fly and a ladybug; in Australia a dipterous parasite.

For the purpose of learning what help we might expect from these quarters in the far East, I addressed letters to Mr. F. Crawford, of Adelaide, South Australia, and to Mr. Samuel D. Barstow, of Port Elizabeth, Cape Colony, both these gentlemen having reported to Miss Ormerod the appearance at their respective countries of insects preying upon the fluted scale.

In December last I received an answer from Mr. Crawford, which speaks for itself:

Surveyor-General's Office, Adelaide.

W. G. Klee, *Esq.*, *Berkeley:*

Dear Sir: I announce the receipt of your letter about the *Icerya* parasite with much pleasure, as I hope it may lead to correspondence that will be to our mutual advantage. I had intended writing to you about this very matter as soon as I found that I was in a position to do something, so that your letter has only caused me to write sooner than I otherwise would.

Since Miss Ormerod's little work was published I have made what I think is an important discovery, viz.: that one of our native *coccids*, a *coelostoma*, is likewise attacked by this parasitic fly. The *coelostoma* is a very large, sluggish insect, capable of living a long time without food, and one that could be conveniently sent through the post. I therefore propose to send you some specimens, of course taking the chance of their being attacked by the parasite. I will do the same with Maskell, in New Zealand. I might also try the effect of posting some *Iceryas*, as they might live long enough to survive the voyage.

The parasite so completely did its work that I have not a single *Icerya* left in my garden. I am now trying to introduce it again, but it has some other enemy that I must find out. Some two months ago I received a small branch of the common gooseberry covered with *Icerya* egg sacs nearly full size. One half, containing say fifty *Iceryas*, was placed in a lemon tree, two or three of the finest specimens being put separately. The other part, with about a similar number, was placed in a glass bottle. Now, at the present time, the gooseberry branch in the lemon is as bare as it could be—not a vestige of the *Icerya* is to be found; but that in the bottle is nearly as thick as ever, although two *coccinellidæ* larvæ have been living and fattening upon them for the last two months, while the bottle is swarming with myriads of newly hatched larvæ running about. This shows that the *coccinella* larvæ are not of great efficacy in putting down *Icerya*, but what clears off the rest in the lemon tree I am quite at a loss to make out, unless birds, and if so, in all probability the English sparrow.

My next experiment will be to cover over some *Icerya* (should I succeed in rearing some from the larvæ in the bottle) with wire netting, so that no bird can get at them, and then note the result.

I need not say that I have gladly accepted Mr. Crawford's kind offer, and that in due time I hope to receive the much valued consignment. I have also obtained the promise from the agents of the Australian Steamship Line, Messrs. J. D. Spreckels & Bro., of assistance in having the insects well cared for on the long voyage, as it must be remembered that they have to pass the equator. If kept in a comparatively cool place, the chances are much better for their safe arrival. The box containing them will be placed in the ice chest.

The President of the Eastern Provinces Naturalist's Society, Mr. Samuel D. Barstow, writes under date of November 25, 1887:

> Touching your favor of September ninth, which I was pleased to receive. The bug season is scarcely matured to insure a definite reply, but I will bear your request in mind, and do my best to comply therewith. The chief point of my somewhat strained experience anent injurious insects, is one which signifies a partial salvation to sufferers. They become injurious by preponderance, or as swarms, and this preponderance and swarming is fitful. The same may be said of their parasites. Again, a swarm of pests is no criterion for a swarm of parasites. Without a doubt, in this Province last season *Rodolia** and *Chrysapa*† worked miracles, which, though the human eye may not discover accurately after effects, reason may safely promise beneficial results. For my own part, I would honestly believe that a gigantic curse has been, at all events temporarily, averted by this remarkable appearance last season. Prior to this I never noticed them, and never heard of them prior to my own observations. What, however, does not appear to be so easily proven (probably through our not experiencing a big swarm) is the fact of *Icerya's* disastrous proclivities. Many of our leading farmers and horticulturists disbelieve the fact, and I myself have not remarked the ruin which our western brethern and American cousins absolutely state as a consequence of the appearance, or shall I not say swarm. I sincerely trust the awakening will not come. I had always strong faith in natural opposition and contingency, and kept a sharp lookout, so if I can devise a plan to let you have my interesting little friends, and if I am again successful in finding them in quantities, you may rely upon hearing from me.
>
> *Rodolia*, as a young larvæ imbedded in *Icerya nidus*, would, I think, with a little precaution, just land on your side in time.

So much in regard to what we may expect from other continents. I shall now turn to a place near by. A month ago I received from a friend in Hermosillo, Mexico, a small box containing several large egg masses of a *Mantis*, or *Rearhorse*, with these also a number of specimens of *Icerya purchasi*, in various stages, and a few days after this a letter followed, of which I give an extract:

> Concerning the cottony cushion scale, in fact anything connected with horticulture, I can only give you my own observations, which are limited, as there is nobody taking any interest in such matters. The leaves and insects I sent you came from grafted orange trees about thirty years old on the Plaza, in Hermosillo, therefore somewhat protected from wind and frost. I am told that three years ago these trees were full of scale, and the next year they entirely disappeared without any observable cause. Last year I looked for scale, but could not or scarcely find any. This year there is considerable, yet it could be worse. Of course nothing is done against it. I find that in an orange orchard of the same age about a mile to the north, on slightly higher ground, although looking closely, no sign of scale. Nor did I find any on orange trees in Ures, sixty miles northeast of Hermosillo. The cold snap here killed all young orange trees to the ground. On a tree here I found a small, black bug with two dark red spots, which I did not want to send along for fear it would eat the scale.
>
> Yours truly,
>
> E. WOLLEB.

The *Mantis* eggs and scales I took to my friend A. Koebele, in Alameda, who thought as I did—that the *Mantis* might prove of considerable benefit in making war on the *Icerya*, although the disappearance of the pest in the Hermosillo Plaza could hardly be attributed to them. A close examination of specimens of *Icerya*, however, revealed that they were mostly eaten out on the inside, and a number of empty cocoons of a minute dipterous insect were found, and also several unhatched ones. The latter, in course of a few days, developed into minute flies, which, being submitted to Professor Riley, proved to be a species of *Phora*. The discovery of this apparent parasite led me to write immediately to Mr. Wolleb, to try to find some more infested *Icerya*, and also some of the ladybugs referred to. In answer to this, two weeks ago I received a small package of *Icerya*, with the following letter:

**Rodolia* is a genus of ladybugs. † Lace-winged fly.

HERMOSILLO, March 14, 1888.

Yours of the sixteenth of February received. I have since examined the tree on the Plaza closely, but could not find any of the small black ladybugs I mention in my last, and found in only one instance an insect not pertaining to the cottony cushion scale species, which I send to-day by mail, inclosing more of your pets of different sizes and colors.

In haste yours,

E. WOLLEB.

Having to leave for the country, by previous engagement, I sent the whole invoice to Mr. Koebele again.

Calling on this gentleman the other day, I found, to my satisfaction, that although the invoice was very small, it had proved quite valuable. The insect Mr. Wolleb referred to was evidently the larvæ of a ladybug, as a very active species of this kind was found among the insects; but what, in our estimation, seemed to be most promising, was the fact that two thirds of the egg sacs of the *Icerya* contained well developed cocoons of the *Phora*. The *Icerya* themselves had nearly all been badly eaten out, thus showing, evidently, that the tiny insects found their support on *Icerya*. This fact has naturally made me very anxious to have this matter more carefully investigated, to learn definitely if in this minute *Phora* we have not a valuable ally. I call the attention to Mr. Wolleb's statement in his first letter, in which he says: "I am told that three years ago the trees were full of scale, and the next year they entirely disappeared, without any observable cause." As regards the probability of the *Phora* being the direct cause we have the testimony of the German entomologist, C. L. Taschenberg, who speaks of the destructive character of the *Phora incrassata*, which infest the honey-bee, causing one of the forms of foul brood. In most parts of Germany, Russia, and Sweden is this fly found in summer and fall on boards and in shrubbery, and crawls into the beehive for the purpose of laying an egg under the skin of the already well developed bee larvæ, before the cells are covered, and just so that the ovipositor is introduced between two segments, and the eggs are laid parallel with the long axis of bee larvæ, the head end of the former close to the head end of the latter. The grub must already be almost fully developed in the egg, as only three hours after being laid it breaks through the egg-shell and bores into the fatty body of the bee larvæ. It grows with extraordinary rapidity. Forty-eight hours after hatching it molts for the first time; twenty-four hours after the first molting it has reached a considerable thickness; again, after twelve hours, follows the second molting, and the growth is doubled, so that twenty-four hours after this it has a length of two and one half milimeters. After further twenty-four hours it measures nearly three and one half milimeters, molts for a third time, and is fully grown. About twelve hours after the last molting it changes its position in the bee larvæ, which is apparently healthy and at the same time has reached its development and has spun, turns itself likewise in the cell—turning toward the cover of the hind parts of the body. When the parasitic larvæ has turned itself, it bores through the main body of its host, through the wax lid, which closes the cell, lets itself drop, and changes, in the bottom of the hive, into a barrel-shaped pupa, or crawls out of the escape hole of the hive, and transforms in the soil. Twelve days after the fly hatches out and hibernates under the bark of trees. These interesting observations were recorded by Aszmusz. The infected bee larvæ dies and goes into decomposition. The *Phora incrassata* is thus one of the dangerous parasites, and the cause of one of the kinds of foul-brooded hives.

I have given this in full, to show the close observation of the naturalist, characterizing the insect as a true parasite, because later entomologists claim to have discovered that the *Phora* only attacks dead larvæ. However this may be, the presence of a species of this genus inside of partly eaten egg masses and dead *Icerya*, is very significant and worthy of further investigation.

The fact of a dipterous fly also appearing in Australia, as an apparent destroyer of the *Icerya*, strengthens my belief that we have a clew to a valuable friend. It should be considered that the very nature of the *Icerya* is such as might attract flies, and other dipterous insects, before any other insects, being as they are naturally drawn to foul smelling and soft, rapidly decomposing tissues.

While I have dwelt on the importance of importing these parasites, I would be very sorry, if it was inferred from my remarks, that my idea is to give up the fight by other means, for I have no such an idea at all. I believe that we must strain our efforts to the utmost, and keep up the gigantic struggle; it really is no matter what remedy we get, no matter how successful the fumigating processes are, there will always remain a vast amount of these insects in inaccessible places, where we can't get at them with our spray, and where these parasitic flies always will find enough to live on and help us. I have good faith in the fumigating process, and I believe that it is going to prove to be *the remedy*, and the mode of treating the orange trees; but I think people in Southern California have made a great mistake to give up the fight, and wait for that; although our modes of spraying are imperfect, they have been the means of staying the attack of the insect in other places. I have, since the last meeting, made some few experiments, and I fully agree with those persons that have tried the resinous compound in various forms. I think that those washes will be found very effective. The resin solution seemed to penetrate very much better than the other solution we have, better than soap, and succeeded better in sealing up the soft parts of the insect and closing them, and I think they ought to be used to a great extent. I have another solution here which I have tried on the black scale, which I think will be equally efficient: resin, five pounds; caustic soda, one pound; water, fifty gallons; sulphur, one pound; caustic soda, one pound; the latter sulphur and caustic soda, dissolved together by boiling, is added to the barrel; this sulphide of soda and the resin solution mixed, I find does excellent work on the black scale. I have not yet had an opportunity to try this on the *Icerya*, but I think it will work equally as well.

J. H. KELLOM, of Tustin: This is something like the science of medicine, which has been running a great many years, and yet is not a perfect science. Doctors differ, and our conclusions differ; our experiments, perhaps, may be similar, and yet we come to different results and different conclusions, which may, possibly, be owing in part to the different localities in which we live. California is made up of localities; climate is local, and soil, and hence what is true in one place will not be true in another. Between Orange and Tustin is a river, and on either side are two different climates; at one time at Orange it looked as if a blizzard had gone over it, while at Tustin there was no indication of any such thing. I came to this country in 1880, and I bought some land and paid $65 an acre, and I bought my trees in a nursery close by, and had them put out, which cost me $35 an acre; hence I found in March, 1881, I had an orange orchard of two thousand one hundred trees—eighty odd trees to the acre, that cost me $100 an acre. Last year I sold the crop on that orchard, including seedlings, some twelve years old, poorly cared for, including the crop of those trees which was not large. I sold the fruit from that orchard on the trees for $5,000. The year previous I realized about $2,000; this present season I am selling the fruit by the box on the tree, at $1 a box, and I don't know what the result will be. The crop would have been considerably larger but for the severe winds which we had in our valley during the winter.

Now, as to the black scale, it has been our enemy, we have fought it, and we have hoped and prayed that this Australian enemy of the scale would come in and help us out, and I think they have done it this last year. I do not think that in our section of the country we have one fourth of the black scale that we had in the previous year, and one half of my orange crop this year is as clean as any oranges you will find in Riverside, or on the foothills. In this new orchard, to my horror, I found about three or four weeks ago one limb on one tree out of the two thousand one hundred trees, where I found indications of the red scale. Now, I would not begrudge $25 to anybody that would take that tree and kill the red scale, without killing the tree. I have not any of these means of killing the red scale; my plan is to take that tree and take off the whole head, and go after it with the different compositions and thereby exterminate the red scale on that tree. With regard to the paste I have tried it only in one instance, a year ago on a small tree that was bearing fruit and the fruit of the tree was covered with the black scale; it was close to my house where I could watch and investigate it, and I cut off all the foliage and made some thin starch, thick enough, however, to put on with a brush, and I bought me a small brush and went over that trunk and what was left of that tree, and I said to myself, if there is any scale on that tree it is fastened there and there can't be any locomotion certainly, and I watched that tree from week to week, and concluded that the starch was a success so far as that persimmon tree was concerned, and lo, and behold, the branches started out the coming year and the tree bore fruit, notwithstanding I had pared it down as I did; it bore three persimmons, and to my horror, one day I went to examine it and the foliage was covered with the black scale. That is all the experience I had with the starch compound.

Mr. Kinney: I was going to say that the experience of the gentleman who has just spoken in reference to the black scale was an observation of mine. About three years ago, I noticed on the brush in the old cañon of Santa Monica, an immense quantity of black scale, principally confined to the artemesia; the brush was dying back from the top, and I expected to see that brush entirely exterminated in that locality. Lately, about a month ago, I was there, and on the same brush you could scarcely find a single black scale; what it is owing to I do not know, but that is a fact. About the same time there was a scale that appeared on the Cañada Rancho in the brush also. I have never seen it on any fruit trees, and I do not know what the name of the scale is, probably these gentlemen can tell; it is a white scale, varying in shape, perhaps, containing the same superficial area that a black scale would, only different in shape, with an exceedingly hard shell. It was on what we commonly call here grease-wood, and was killing that; the brush died back from the top; that scale has disappeared also. Now, I have never seen that scale anywhere else except on that particular ranch, and I do not know what it was. Now, these scale bugs do die out, because we have never had any trouble in the foothills where I live, at all; the black scale never has troubled us, but the red scale is the enemy that we dread. It seems to sap the vitality of the tree to such an extent, that if anything comes along in the shape of a wind, the tree will not hold what oranges it has, but will lose them; not only that, but what oranges we do get on infested trees are covered with this scale, and the sale of the fruit is very much deteriorated, and we can't get a good price for it. Now, this spraying with flour is a successful thing, it is a cheap thing; and it seems to me that it ought to be more extensively tried and experimented with. I have heard about it a good deal and I am going to try it. The red scale is an exceedingly difficult scale to get at; it don't fall off the trees, and it does not seem to breed in the ground; you can exterminate it, because it has been done. It is not generally known that the red scale attacked an orchard in Riverside; it did, and the neighbors of the gentleman went to him, and talked to him, and he made up his mind himself as to the danger from the scale, and he destroyed the orchard. It was only a small one, something like ten or fifteen trees, so you could hardly call it an orchard. He cut them down and burnt them up, and the red scale has no foothold in Riverside whatever. But you can find black scale; I have seen it there myself in the gardens, in Mr. Gosbee's place. I have seen it there myself where the garden is very thick with foliage; it prevents the sun and dry air from circulating, but it does not amount to anything, it has no strength in that climate. But if they ever get the red scale there, it will be very serious. I merely state that to show that you can get rid of the red scale.

Now, the white scale, that is the fluted scale, is so different from the other scales, and so characteristic, it is easier to kill—the individual is easier to kill, I believe, than almost any other—it confines itself very largely to the main stump and the branches of a tree; it gets into the foliage later, but it does not, as a rule, prey on the foliage; it is almost entirely confined to the bark; it is attached to the trunk. The greatest trouble that I have had with the white scale on my place is the fact that that scale there lives and breeds in the ground, or goes there and lives long enough to get back on the tree. That is the greatest trouble that I have had. Now I can go with a spray and kill every white scale there is on the tree. I have got a spray that does that, but I do not think it kills the eggs, probably it does not, but at any rate you can practically kill nearly every one there is on the tree if you are careful; but you go to that tree four or five weeks afterwards, and you will find more white scale; you can see the little ones climbing up the tree in considerable numbers, or a tree that has never been infested will have a good many. There is the trouble, after you have killed the white scale, you have not killed it; that is, there are enough in the ground, and around that tree, to go up there again. On my place I have observed the scale breeding apparently, or living on the crown of the tree, a little under the ground, so that, in treating the white scale, it becomes important to examine the bottom of the tree, to see if there are some of them there. I find that they are often very thick; that may be owing to the peculiar treatment that I have given my trees. I have a system of irrigating them with basins, and that may have something to do with it.

Mr. Baldridge: The gentleman has called your attention to a fact that is not given sufficient importance to: that California is a country of localities, and what will apply to one locality will not to another. I apprehend that is the main reason why there is so much conflict of opinion in regard to methods. The conditions are not fully and faithfully stated under which results were received. Now, my climate is altogether different from yours; it may be possible that the humidity in your climate would prevent the effective working, to some extent, of the starch. I put it on very thin; I judge you use it thicker than I do, and in a humid climate it might not dry and do as well; with me, the air is very dry, and I put it on very thin, and spray it faithfully; the coating is exceedingly thin, and it cracks, and all comes off and leaves your tree perfectly clean; it does not injure the foliage, or the fruit, and it takes all the dirt, all fungus, everything with it, both off from the foliage and the limbs. Further, I have a couple of large oleander trees, and I believe the black scale are harder to kill on them than they are on the olive, and I have tried this on those two trees with very satisfactory results. I examined them the other day, and found only a few alive, and I think another application or two will clean them entirely, whereas, they were before literally a mass of black scale. I would like to ask Mr. Klee how he accounts for the fact, that in an orchard of two thousand trees, five trees scattered at various points over the whole orchard are a literal mass of scale, like as if they had been deposited by a fly, and the rest are perfectly clean?

MR. KLEE: The only answer to that is that they happen to be upon those trees and, gradually increasing, make the tree unhealthy, and they live better on that tree.

MR. BALDRIDGE: They make their appearance there at once; there has never been any there before this year in trees two years old.

MR. KLEE: It must have been brought there by something, no doubt by birds. I think that is the most rational thing to suppose. I see no reason to think they are produced on the tree from nothing; they come from a mother insect, and that mother insect must be brought by some agency, and that agency is generally a bird or other insect.

MR. BALDRIDGE: What astonishes me was that they could bring enough to so thoroughly infect a tree at once.

MR. KLEE: I have seen in the midst of an apple orchard, where there was the nest of a bird, one limb totally covered with the scale, just on that one tree, right in the midst of that orchard, and on the limb where this was the limb was literally covered with the San José scale.

MR. J. W. SALLE, of Pomona: With regard to the pest, I want to say a few words. The red scale infests the fruit and foliage more than it does the tree or its branches. The fluted scale lives principally upon the tree and the branches; the red scale is a very delicate, fibrous scale; the paste, when put upon the tree, will only crack and come off of the foliage and the fruit; it don't come off of the butt of the tree, the rough bark; however, it attaches itself to the red scale and takes the scale off with the fungus of the black scale also, from the leaf and from the fruit, but it does not peel and take the scale away from the body of the tree, or away from the branches or rough bark of the tree, consequently the paste is very efficient against the red scale, while it does not affect the San José scale or the black scale but little, except to remove the fungus of the black scale from the leaves. It does that, but it does not take off the old scale bugs or carry them away, neither does it take off the white scale. When you put the spray on it, in less than twenty minutes it would take and run off with the paste; it will do it in twenty minutes from the time the paste is put on; that is, the white scale; but the red scale is easily taken off by the paste, and hence those orchardists around Orange, and other places, have made the raising of fruit successful by the use of the paste. A little over a year ago I tried paste upon the San José scale, put on two applications, so as to have the thing thorough, and was satisfied that the tree was thoroughly treated, but the season showed that the bugs were not killed, that they came on later, and were on the tender branches of the tree. I want some of you gentlemen from the north who have had a good deal of experience in treating the San José scale to give us some information about it. It is a hard bug to handle with us. On some young pear trees I found some of the San José scale, and treated the trees with pure coal oil twice, at different times, put the coal oil on with a paint brush, for the trees were small, and I wanted to kill the bugs, but I didn't do it. That year the branches came out from the stump, and in more than half the cases the bugs were there, too. on the new growth.

There is another side of the scale bug question. We have got an immense country in this State of California, different localities, different conditions. As has already been stated, it is not every locality that is suitable for raising the best kind of oranges, or the best kind of prunes, or peaches, or pears. You can't go anywhere in the State of California and raise them all. If you could raise the best oranges for market on the low, damp lands, near the ocean, where they do not need any irrigation, that would be all one vast orange orchard; but you can't do it, the scale bug comes, the black scale, and makes it all black and smutty, and you can't sell it for much; so with other varieties of fruit. I have prepared a few statistics. The amount of oranges consumed in the United States is about eight million boxes; the number of trees necessary to bear that, counting two boxes to the tree, is four million trees; that is the entire United States. We will grant Florida a million and a half, and we will take two and a half million trees in California. Now, the number of acres of land to grow this fruit on, at eighty trees to the acre, is thirty-one thousand two hundred and fifty acres. The number of trees already planted in the State of California is about two million, to say nothing about the immense area of the northern citrus belt—about two million trees planted in Southern California. Two and a half million is all we need to raise the requisite amount to supply the United States, to say nothing about the supply that comes from the Mediterranean; we are going to absorb all that with a protective tariff. Well, the number of acres of land now suitable for first class citrus culture in Southern California—and I do not mean the low land next to the ocean, I mean where the conditions are perfect, as we have got them—is seventy-five thousand acres, more than twice as much land as we need to raise the required amount, and for the next season's planting we will want more than two and a half million trees. What are we going to do with all that fruit? The scale bug comes in and tells you exactly what you are going to do with it. This is the only relief you have got—the scale bug. Old nature knows more about it than we do, and we are here to-day to find the conditions that nature intended we should improve for citrus culture, and for fruit culture of all varieties. We are going to find those conditions.

Mr. A. Scott Chapman, of San Gabriel, offered the following resolution:

Whereas, There are $20,000,000 invested in fruit culture in this State; and, whereas, this may indefinitely increase if given the proper conditions; and, whereas, the white scale bug, *Icerya purchasi*, threatens the very existence of the citrus fruits in this State, as well as numbers of the other fruit trees; and, whereas, it stands to reason, that there are parasites for these different scale bugs, in the places of their nativity; therefore, be it

Resolved, By the fruit growers of California in Convention assembled, that the United States Congress be petitioned for an appropriation of not less than $50,000, to be used by the Department of Agriculture, for the purpose of sending experts to those countries where the baneful insects are known to have originated; to discover, if possible, their natural enemies, the parasites, and introduce them to this country; also that the Department of Agriculture be enabled to make actual experiments here in the field, to, if possible, overcome these injurious insects, etc.

Mr. Salle: This is in accord with the position I take, that nature should afford us a remedy and horticulturists should look for a natural remedy for the scale bug, and this certainly is the proper way to do it. There must be natural enemies to these scales, for they are natural enemies to mankind, and nature must afford some natural enemy to them, and we want to find it. We want to find the parasite that preys upon them; we have been unable so far to do so, although there has never been a concerted effort upon the part of the fruit growers of the State, and this certainly would be the most practical way to get at it. I most heartily support the resolution.

The resolutions were adopted unanimously.

MR. SALLE: Nearly all the insect pests have been imported to Southern California, and at the present time we are on the eve of an immense planting boom, and there is not and will not be for the next two years, sufficient nursery stock in our part of the country. I do not speak for the northern part of the State, because I do not know the condition, but in the southern part of the State there will be an immense number of trees imported within the next two years. At our last County Pomological Society meeting, we passed a resolution recommending to people of Southern California to be very careful in the importation of trees, not to get any other injurious insects in addition to those we already have, and in the same resolution we cautioned them also to be particular about the variety that they were planting. This is not exactly on this subject, but it comes under the same head. I don't know but what a resolution of that kind would be very appropriate here. Many in their frenzy and their wild ideas of boom to improve, they forget about the dangers that may come from importing trees, but we have the past sad experience to guide us in the future and we ought to profit by it. I think that men should be very careful in importing stock from other countries. I was East this winter in my native town, in Missouri, and we were talking about scale bug in connection with other subjects, and some of the parties that we were talking to wanted to know what they looked like. "Well," I said, "I guess I could show you"—there was no oranges then from California, but all from Florida—"I guess I can show you if you have any oranges." Well, we went around to the grocery store, and from the very first box of oranges I picked from, there were two different varieties of scale, and both distinct from anything we have in California that I am familiar with; making it appear just as bad as our scales out here do. We are importing large quantities of oranges from Florida, and are most sure to get those scales. We have got to bring prune trees, and peach trees, and apricot trees into Southern California, from somewhere else. The real estate boom of the last two years has absorbed everything, not only the orchards and vineyards which are largely going to waste and the fruit to rot upon the ground, but it has dug up all the nurseries and taken up all the nursery stock; that is to say, there was none planted, and we have got to have the trees the next year. If you have got any scale bug up in the north we don't want you to send them down here, and we don't want to send you any. I don't know that the resolution would be in order, but the remarks certainly are.

MR. KLEE: Too much stress cannot be laid upon what Mr. Salle refers to. There is great danger, undoubtedly, and I have called the attention of the fruit growers to the fact that we receive large importations of orange trees from Japan. I have endeavored to have everything obtained from there thoroughly disinfected; yet some may escape. There is no good system about appointing any one to look after it, and it rests with me largely to see that it is being done. Now, these trees, of course, that come from Japan, have to go through San Francisco, but orange trees come from Florida, and there it is well known they also have bad scale insects; some are not so bad as they used to be, as some varieties there have parasites now. It is probable that the first few years, at least, after they were imported here, they would prove equally as bad as anything we have, and we would have to go through a period of terror in regard to them; hence I believe that no shipment from Florida or any other country should be planted without being thoroughly disinfected; each tree dipped singly into a solution treated in that manner, I don't think that there is much danger; I doubt that all of the trees that have come from Florida have been treated so; I believe that a majority of them have. All the nurserymen that I have come in contact with have promised me to attend to it; but in a State of this size, with so many places from which trees may come, it is impossible to keep track of all the nursery stock, and it must rest upon the people at large, or each locality, to see that we are protected. I think that the formation of local horticultural associations, or whatever you may call it, who may appoint some one amongst their number to look after this, would do a great deal of good in that direction. I have always been urging the formation of such societies, and for that reason, if for no other, it would be very wise to have them formed.

Vice-President Ivison in the chair.

Mr. Cooper: I have been using the kerosene emulsion, as laid down in the Horticultural Report of 1885, for several years. I have adhered strictly to the proportions and the manner in which it is to be prepared, as given in the report.

Three years ago I purchased in San Francisco five different kinds of kerosene oil; all came down in one invoice, and four of them I found to emulsify very readily, and to hold the water in solution after being diluted. Last year I did not do anything; I was East, and neglected my trees, especially the olive trees, and they became thoroughly infested with the black scale. I have not seen anything the like of it since I have been on the land, so that I determined this winter to give them a thorough spraying. The best time to spray an olive tree is in the months of January and February—late in January, because they commence to hatch in the month of July, and keep on until the first of February; there is no question about it. You will find them on the olive trees from a size which you can scarcely perceive with the naked eye to almost a full grown, mature scale, at the same time; and while milder washes will destroy the minute scale, it has no effect whatever upon the mature insect, and, so far as my experience goes, there is nothing short of caustic soda or kerosene oil that will destroy them. Caustic soda is very dangerous to handle; you cannot employ men who will endure the unpleasantness of using it so strong as it has to be used to kill a mature black scale on olive trees, and they do not object to using kerosene oil. We had so much rain in Santa Barbara County in the months of January and February that we could not get on the ground with teams, and we had to postpone it until late in March. I ordered from San Francisco the first invoice of three hundred cases of kerosene oil, without designating the particular brands. The oil was sent down, and I commenced washing in the usual way, with about seven gallons and a half of water to one of kerosene oil. After three weeks—that is, three weeks after the first washing—I found that a great many of the olive trees had lost all their leaves and the ends of the branches were killed; and, by further investigation, I discovered that the first trees washed were washed with water, and the last trees were washed with oil—that is, that the oil did not hold the water in solution. I then investigated further. I had the same man that had been emulsifying, the same man that had been washing—there was no difference in the care. Then I purchased, in Santa Barbara, such brands as I could get, for experiment, and I found that while there was no apparent difference with regard to burning qualities of different marks of oil—each having on the outside of the cases "150° fireproof test"—that one quality of kerosene oil would hold the water in solution, while another, of the same test, would not hold it. This difficulty I had not experienced before, and I attributed it to the fact that the low prices of kerosene oil probably induced a very serious adulteration, and I am convinced that such is the fact. I stopped using the kerosene oil I first purchased, and ordered two hundred cases more, so you see I am not dealing in kerosene oil in small quantities. I use more kerosene oil, probably, than any man in the State of California, for spraying purposes.

I found that an oil that I purchased in Santa Barbara, "Pearl Oil, Blue Mark, Cincinnati, Ohio," put up by the Standard Oil Company, would emulsify by passing it through the pumping operation about six or seven times, while Elaine oil—which is considered by people who use oil in Santa Barbara as the best for burning purposes—required about ten or twelve times; the Astral oil required about thirteen or fourteen times. All these oils were put to me at the same cost, so I confined myself, for the time being, to the Pearl oil, as it held, or seemed to hold, the solution of water better; and I was not pumping pure water on the first trees—pumped from the tank—and pure oil on the last trees. Now, this has been a very sad experience to me; because, while it could not be discovered in the spraying operation, such was the fact. It was used by the same men who have washed trees for me for the past five years. I gave considerable attention, after the oil appeared emulsified, to watching when the boiling water was poured into it, in order to thin it sufficiently to put in the tank; and I found that while some cases of oil, just as soon as the boiling water was poured into the barrel where the emulsified oil was, that the oil would rise to the top; others you could fill up the barrel with boiling water, where it was in solution, and the bottom of the barrel had just as much oil as the top; so that I am getting rather doubtful as to the coal oil business, unless I know what coal oil it is.

This experience I have not had previously. It takes about three weeks after the washing is done before you can tell the effects of the coal oil on the trees; then we find all at once that the leaves are gone, and then the ends of the small branches are dead; and your crop is gone for that year at least, possibly the next. This same spray has no bad effect on the orange tree. I have some orange trees that have been washed by the same men and the same mixtures at the same time, and it does not injure the bloom; it kills every scale on the tree; that is, the black scale, and the soft orange scale, and another variety of red scale which is to be found on my ranch (those three varieties on the same tree); kills every one of them wherever it touches. By one washing a year of orange, lemon, and lime trees, I can keep them as clean as they are in Riverside. There is no difficulty at all with the kerosene emulsion, in regard to the strength of it. Cut all the leaves off, no matter, the bloom is there; they are blooming out now, and they will have more on than they ought to have, and so with the lemon. But the same operation has no effect on the olive tree; it is most simple, for while it is successful on the orange, it has but little effect on the olive, side by side, the same scale, the same men, the same oil. Those from abroad who have an opportunity of making an excursion out to the place, to-morrow, will see the effect of this oil on olive trees, as well as on orange, lemon, and lime trees. I have subjected them all to the kerosene emulsion as being the most effective, and the only sure remedy for the black scale, that I know of. It should be used in January and February, and one washing will generally reach all the black scale and keep it in subjection without injuring the tree. The trees commence to grow about the first of April, so that, if washed in February, it will have the whole month of March to rest and do nicely, and the blooming will commence about the thirtieth of May, and it will bear a full crop; but if the washing is done after the fruit buds and the young tender leaves start, you will destroy your crop for that year. Washing in the fall will not answer, and rain in January, February, and March will make it impossible to get on the ground; interferes with the whole business.

A Delegate: I would like to ask you if this kerosene emulsion is effective on the *Icerya*, or don't you have any?

Mr. Cooper: I think it will kill the *Icerya purchasi*, or any other insect. I have no *Icerya* on my place; I had one tree three years ago, and I have treated once a year quite severely with kerosene emulsion, and I think there are no insects on that tree now. I, of course, did not cut the tree down and burn it up, because there were only about a dozen citrus trees in the orchard, and I determined to see whether it could be kept in subjection; I did not care if it did spread to the other trees. It has not spread to the other trees, and there is no perceivable insect—that is, *Icerya*—on the trees that were not infected, and it had no treatment that an olive orchard could not have. The emulsifying of kerosene oil, etc., is one of the most difficult things to handle; it must be done well, otherwise you see the ill effects of it.

Mr. Baldridge: In view of the fact that there must be an immense amount of spraying done, and many men are likely to repeat your experience, and get no result for the loss of time, trees, and fruit, it has occurred to me that it might be possible, through this organization, to make some arrangement with some refining house, and preparing the standard oil for that purpose for the State of California, upon which they could guarantee to a certain standard, and upon which everybody could rely.

Mr. Cooper: I might say in addition to what I have already said, that one great difficulty in spraying trees in a large orchard is this: It takes five men, with a good team, six weeks to spray my orchard, and if we could do it in the fall of the year, when the ground is hard and the conditions favorable, it would be a very simple process, but it must be done in the months of January, February, or March, in order to affect them, and those are the months that we are liable to have most rain, when it is impossible to get on the ground. The other simple remedies will not kill the black scale on the olive tree. The starch will do, I suppose, when it is first hatched out, but by the time you get over the orchard, when it takes you six weeks, you would have to commence a second, and perhaps a third time, and if it be repeated five or six times, the labor would be too expensive. Caustic soda, too, on trees of a sufficient strength is too severe; it would kill all the trees back before you probably are aware of it. I have many trees that never have recovered from too severe solutions of caustic soda, but as the gentleman stated, the question of kerosene oil is a very serious one; if you intend to adopt the kerosene emulsion, there ought to be an organized plan by which we could secure an oil that we could depend on, and not buy, as I have this year, three hundred cases of an oil that I cannot use, and most of which I am now trying to sell. And not only that, but you find one half of the trees severely injured, and the crop of this year killed.

Mr. Chapman: I made some emulsions about three weeks ago, one from crude petroleum, that emulsifies very well and dissolves in water, and the oil does not part from the emulsion. I don't know what kind of oil I used, very likely the Pearl. The petroleum came out a sort of a gray color; to start in with, it was perfectly black.

Mr. Cooper: The Department of Agriculture in Washington does not recommend crude petroleum. I bought some crude petroleum very cheap (about four dollars a barrel) that came from Ventura, but we could not do anything with it, and I made up my mind that the experiments made by the Agricultural Department at Washington had thoroughly tested those matters and gave it up. They recommend the best quality of highest refined kerosene oil, and I have uniformly tried to adhere to the plan laid down by the department.

Mr. Crawford: I would like to ask Mr. Klee if he has ever experimented with the lime, salt, and sulphur wash on the San José scale?

Mr. Klee: No, I have made no experiments with it; I have read a good deal of it. It has been used in Tulare County, and there was quite a report of it at the last meeting from the Tulare County Horticultural Commission, recommending it very highly.

Mr. Peck: I would like to say, in answer to the gentleman's question, that in Placer County that remedy was used with good success last year and this year.

Mr. Crofton: I used it this year and last on trees that were badly infected with the San José scale; I made a preparation and sprayed the trees; of course they shed their leaves, but I found it killed all the scale. We find the scale on the Sacramento River, around the crown of the tree below the ground on the roots. It probably is the case with some of the gentlemen here to-day, that in spraying or washing their orange trees, that they do not take the dirt away from the roots where the scale may be, and they increase from that. I have sprayed with this lime wash; it is very easily prepared and I think it is a good wash, and I have done almost all my spraying this winter with it.

Mr. Cooper: I have tried the lime wash very thoroughly on the black scale on the olive tree. It will not answer. The most efficient remedy that ever I happened to try was a preparation made in England, called Cooper's sheep dip. I tried it on the olive trees exactly as they used it for the scab on the sheep, and in thirty minutes it killed every scale that was on the trees, and in three or four days the tree died. I have not used any more since. The manner in which I used the sulphur and lime was taken from a report of the Los Angeles Convention two years ago; two pounds of sulphur, one pound of lime, and three gallons of water, boiled about one hour, and add three gallons of water to one gallon of the mixture. There is no salt in that.

Mr. Crofton: I use in that a pound of salt to a gallon of water.

Mr. G. M. Gray, of Chico: We have been trying this salt and sulphur remedy in Chico, and thus far we have not met with very good success, although we kill a great many scale. We did it as thoroughly as we could, but on very large cherry trees it is difficult to reach the tips of the limbs. I would like to ask the time of year when they have met with the best success.

Mr. Peck: I should say in our county we commence about the first of March.

Mr. Crofton: I tried it last fall, in September. That is, when I first applied it; it killed all the scale on the pear trees at that time; of course, the leaves shed too; it burnt the leaves, but it killed all the scale, and the tree is coming out very nicely this year.

Here the Convention took a recess until half-past one o'clock.

Afternoon Session.

The Convention reassembled pursuant to adjournment.

APPLE CULTURE.

Essay by O. N. CADWELL, Carpenteria.

The apple is monarch of fruits for the temperate zone. Much is expected of the apple, and no fruit responds more bountifully for labor bestowed upon its culture. I believe the apple has a bright future even in Southern California. If I were about planting trees for profit, apples would come first, and more of them.

As to varieties, let us see what kind do the best in our vicinity. Many varieties that do well further north may fail in some respects here. Here the Yellow Bellflower excels. You may start at the northeast corner of Maine and look carefully all the way to the Pacific, you can find no Bellflowers more luscious or beautiful than those grown here. I have seen many of other varieties just as good as need be grown anywhere.

We can select varieties that do well here, that will give us apples from July to April. Every owner of a few rods of land for a home, should raise at least apples for the family. If your room is limited, do not let the ornamental crowd out the useful. A nice apple tree is very pretty, and none more useful.

Red Astrachan comes first for early, giving fruit every year, and a good grower. Yellow Harvest is of better quality and a little later. Fall Pippin is a splendid apple for the family. Yellow Bellflower and White Winter Pearmain, with those already mentioned, make up a good variety for home use. More apples and less pork brings more health and pleasure for the children.

For the market there is such a thing as having too many early apples at one time, in the season with the rush of other fruits, but as yet we have not been able to supply the market for late-keeping apples; some other place has furnished the apples and taken the money. With proper care and selection of varieties, we can raise the apples and keep our money at home.

PLANTING, PRUNING, ETC.

Be sure you have good trees, with strong, clean roots, to begin with.

For a family orchard, trees of three years or more growth can be safely moved, and have fruit right along.

For the orchard, good strong trees, one year from bud or graft, are best. Twenty to twenty-five feet each way is near enough to plant, and often thirty feet or more is better.

Be careful not to set your trees too deep.

As to pruning, I have no arbitrary rules, except I want my trees branched near the ground. After planting, cut your tree off twenty inches to two feet above the ground. Use your judgment about the number of branches to let grow, but keep the tree well balanced, so as not to grow too much one-sided. Cut back enough to keep the branches strong, and trust a good deal to nature to make a good tree, after getting a start in the way a tree should grow. If you are going to put a two-story top on your tree, do so at once, or as soon as the body will be strong enough to carry it. Cut the branches well back, or the first heavy crop of fruit will either break or bend the branches down all around the body of your beautiful tree.

I have not dwelt so much on the varieties of late-keeping apples as I should have done, but I have not had experience with their culture. Many of the late-keepers of the north will not do so well here. The Yellow Newtown Pippin does very well, but it does not keep any longer than the Pearmain; that is my experience; it is a very good apple, however. In selecting apples for future planting, let us be careful that we get the varieties that keep, and we will save ourselves from loss.

MR. BALDRIDGE: Have you had any experience with the Newtown Pippin, as being a longer keeper here than it was back East?

MR. CADWELL: The Newtown Pippin is a very good apple here, but you will find that it has lost its acidity in a great measure. None of the apples grown in the East, that we have had any experience with, including the Greening, and the Russets, have got the acidity; they are not as tart as they were there. As I mentioned in the essay, the seedling apple comes nearer the apples we used to eat there when we were boys. I know my taste was very keen when I was a boy for a good apple, and some of the seedlings remind me very much of them. Some are quite tart, and some quite sweet. The Greening does not keep. The Fall Pippin is a fine apple for family use, but when the market is full of grapes and pears, and everything in the way of fruit, our apples go for little.

MR. BALDRIDGE: It seems to me that the Newtown Pippin could afford to lose some of its acidity, and being a good keeper, it would be a fine apple.

A DELEGATE: Have you any experience with the Northern Spy apple? We raise it, and it is the finest apple I have seen in California; it is very tender, and I have never seen it elsewhere.

MR. CADWELL: We are troubled considerably with the woolly aphis. We have none of the codlin moth in Carpenteria; I have not seen a codlin moth there. I have not been successful in destroying the woolly aphis during the fifteen or twenty years that my apple trees have borne, since I have been here. It is time, certainly, that they were replaced with new trees.

MR. KLEE: How is it with Spitzenberg?

MR. CADWELL: I have seen fair looking apples, but they don't have the flavor of the New York Silver Spitzenberg, or in the Sierra Nevada Mountains, where I have eaten apples from seedling that was grown, I suppose, from the Silver Spitzenberg. On the trees I had in Lake County there was a Spitzenberg that was growing by a row of Winter Greening, and this seedling had a good deal of the Silver Spitzenberg, and the tartness of the Greening, and was a very fine apple. I have taken pains and trouble around the country with any one that has raised the Silver Spitzenberg apple and know the tree, and it is an apple that has a luscious flavor, one of its own.

MR. IVISON: I would like to ask Mr. Cadwell why it is we do not have the sweet apple, as we used to in the East?

MR. CADWELL: That is a question that is pretty hard to answer. I have sold seedlings that were sweetish, but I have not seen the sweet apples of the East. That is a question that cannot be answered, unless it is, I suppose, because we are in California.

MR. SALLE: There is no place in the world that can raise an apple that makes a better appearance, or gets a better size, than the low, damp ground of Southern California, say down in Westminster, Los Angeles County, where it needs no irrigation; the trees live but a short time, however, and the quality of the fruit is much inferior to apples raised on high lands, and they do not keep so long. I live at Pomona, at an altitude of a thousand feet, and this territory I have spoken of, is one hundred feet probably above the sea level. We have in our markets at Pomona, first, the apples from the low lands, and they disappear along in January or February;

then there are apples from the valley of Pomona, one thousand feet altitude, which keep much longer: but the best apples I have ever seen in Southern California are raised at an altitude of two thousand feet, upon the San Antonio Cañon, where there is an apple orchard twenty years old; and I do think the fruit raised there, in flavor, keeping qualities, and in every way, compares favorably with any fruit that is raised East. I certainly would not advise any one to plant an apple orchard for profit, on low, rich land. If they have rich land at a great altitude up in the mountains it may do, but there is no one that raises apples for profit in our part of the country. I do not know of anybody that brags about the profit they have got off the apple orchard.

Mr. Cadwell: The profit comes in by having the fruit when there is a demand for it. I tried to get long keeping apples. These apples that are raised on this moist land which the gentleman speaks of, who certainly could not brag of their quality, of course they got hard knocks, as a great many of our apples have done; but there is quite a few apples that have the exquisite flavor of the apples grown East. The Rambo does not have that flavor here that it does have in the mountains; the Bellflower has a flavor as good as any Bellflower grown in any other part of the world—that is my opinion, and it is one of the finest apples; the White Winter Pearmain is just as good here as any I ever saw anywhere. The Fall Pippin's flavor is just as good, and is a nice, fine apple, and why the Greening does not do as well I do not know.

Mr. Baldridge: I have a small apple orchard, planted as an experiment, an orchard of some seventy-five trees, including a number of varieties. My land has citrus conditions, as the color and flavor of the orange indicate, but it will not grow apples; the sun bakes them on one side, and they get all mixed up in their blooming. They don't know whether it is this year or last. I do not see any good in them, and I shall have to take them up.

Mr. Gregg: One kind of apple has not been mentioned, and that is the Canada Red. I think they stand the hot weather perhaps better than any other that is raised in the Sacramento Valley; they keep long, and are more brittle, hard, late, and quite tart. I think the time is coming when the culture of apples, especially those that will do well in the warm valleys, will be profitable, and that the fruit will find a ready market. We have several kinds planted out that are claimed to fill this need, but they are not in bearing yet, so I cannot speak from knowledge what the result will be.

Mr. Cadwell: My experience is a good deal like that of the other gentlemen; that the apple tree didn't know where she was; it troubled me a good deal when I first came to Santa Barbara County. They didn't bloom until June or July; some years they came out prematurely; some years they bloomed all the time. But after living here three or four years, and letting the trees grow, I found they had an abundance of apples every year, and it made no difference whether they didn't wake up till July, we had them every year, no frost to check them off, no sun to bake them. We had plenty of apples in this vicinity, and we can keep them up fairly until April.

Mr. Heath: I have had some slight experience in apple culture in Santa Barbara. The rule in Spain and France is, that where the orange grows to perfection, the apple ceases to be of any value. Although I knew of the existence of this rule, being a New Yorker, and fond of apples in my early days, in examining the old Mission propagating gardens here, I found that the padres had a variety of apples; those seedling and what would be considered to the American taste an inferior apple, but really a fine apple for making pies and keeping well. Seeing those experiments I resolved to try, and planted a good many varieties. Of the different varieties, I failed more times than I succeeded, because of the existence of the surrounding circumstances. The apple, really, is a cold country fruit; it is not a semi-tropical fruit, and when you speak of hard apples you must remember that as you approach the tropics you lose the tart of the apple always, and while we are here in Santa Barbara in the latitude of Charleston, South Carolina, you really have a climate similar to Vera Cruz. Yet, while in Mexico, the apples cease to grow and be of any value, here in Santa Barbara we raise fair apples. I raised several varieties that did well, and in the early days I got fine prices. The Spitzenberg I tried with other apples; the trouble with it here is, that it fails to produce its fruit in even size, and the acid of the fruit was lacking. It was not a New York Spitzenberg, nor could we expect to have that in the climate of Vera Cruz. We have some varieties that do well. The Roxbury Russet is equal to the choicest Roxbury Russet that is ever grown in Massachusetts. I have placed them before gentlemen coming from that State, who pronounced them equal, if not superior, to anything they ever had in that State. The Rhode Island Greening, which was a fine apple in the East, I have produced in the Carpenteria at an altitude of but one hundred and seventy-three feet above the tide, where the water was not nearer than twenty-five feet to the surface, where I could grow strawberries in every month of the year, pronounced to be equal to Rhode Island Greenings of the Eastern States. Now, I say, while the varieties that we have here are few in number, the varieties happen to be of the very choicest kind, and we are fortunate indeed in this climate that we are able to produce apples at all. I say, the peculiarity of our climate is an anomaly; it is strange, it is surprising. Now, at our expositions here of our County Horticultural Society, which generally has its meeting in October, are shown apples as fine as I have ever seen from anywhere, and I won't except Central New York. And I think apples from one of the valleys in this county, Lompoc, took the premium at the State Fair.

FRUIT DRYING.

Essay by H. Goepper, Santa Ana.

To the State Board of Horticulture: Your worthy Secretary, Mr. Lelong, having requested me to prepare an essay on "Fruit Drying," I will comply, with some feelings of reluctance, for numerous reasons, the most urgent of which are: Only having two seasons' experience, there are many who are more competent for the task; and, second, age and infirmities having compelled me to retire from the business, I don't feel the enthusiasm in it as formerly. But if my little experience will be of any benefit to any person, they are welcome to all of it.

In the first place, I will give a brief description of my rustic smokehouse. It is a plain, square box, about six and one half feet high, and wide enough for sliding my trays lengthwise into it, and four inches deeper than the width of my trays. Standing on the bare ground, for obvious reasons it has no floor. On the sides are slats, just far enough apart to admit the trays easily. Mine takes in fourteen of them. The door is shut tight against the edges of the sides, with the battens on the outside. The trays are put in alternately, the first to reach the back, and the next the door to shut against, so as to cause the fumes in ascending to sweep over the surface of all the trays. Now, I have to make some remarks as to the stage of ripeness of apricots and peaches.

In my first season's experience I found that the fruit, after it became soft, and in the best stage for eating fresh, when dried it would turn dark. The cause of which I learned since was, that I did not use enough sulphur, and last season I put the most of it in in that stage, and it turned out perfect in color and better in quality than when put in sooner. As they were put and nicely laid on the trays, I laid them in the sun until I had enough trays for filling my smokehouse. I then laid a piece of newspaper, about a foot square, on the bottom, and put a double handful of sulphur spread over it, set the edges on fire, shut the door, and left them in until I had another batch ready to go in. Then I took them out and exposed them to the sun. After sundown I would stack them and cover the top one with an empty tray.

To expedite the drying, I also used a home-made drier, which was simply two brick walls twelve feet long, with an arch in front and a chimney at the rear about eighteen inches higher than the front, inclining to the south; covered it with a frame six inches deep, with a sheet-iron bottom, three feet wide, and this bottom I covered two inches deep with fine gravel, for the trays to rest on and keep them from igniting, and covered the whole lot with two hung windows, such as are used for hotbeds. After my fruit was nearly sun-dried, I would finish it in the drier. I would build a small fire after sundown, keep it up till bedtime, and leave it with a heavy chunk of wood to last over night. After being dry enough so as it would rattle, I put it in boxes, and covered them up tight, to prevent the ingress of insects. The process with prunes is the same, except instead of pitting and sulphuring them I had a basket which fitted loosely into my washboiler, which I had half full of water with a little lye in it, over a brisk fire. Into this, when boiling, I dipped my prunes for about one minute, and after letting them drip a little I dipped them in a tubful of fresh water, and spread them on the trays.

Mr. Cadwell: I have had some experience in drying fruit in this part of the country, in this county. Fruit drying here is mostly confined to evaporators, or fruit driers, as they are called. We do not have sufficient sunshine to dry fruit extensively, or to cure raisins here on the coast. We may dry a little in the sun, but if we have a great amount of it, we may have a few days of bright weather, and then you may get a day like we had this morning, so we can't dry fruit successfully in the sun. Those living in Fresno, and the interior counties, have a great advantage over us in that respect. If our driers are properly constructed we can dry fruit successfully and keep it. I have used driers of two or three kinds, and can see very little difference in the product of the drier. If a drier is used properly, one will make as good a product as another. We treat our fruit with sulphur, if it is overripe, particularly on apricots; if it is overripe, we treat it with a little sulphur smoke; we bleach it, similar to this man's way of doing, some burning it one way and some another, but the result is about the same, and then we put the fruit in our driers. I have a drier of my own construction, which does good work. It is modeled somewhat after the plan of the Burns drier, but is not like it. It does good work, and more of our fruit should be dried and properly cared for. After we dry our fruit we are troubled a great deal with the fruit moth, a fruit worm, some call it, but it originates from a nice little butterfly, or miller, flying about. One would think it was an innocent thing, but as sure as you leave a little place where a worm can get in, it will injure the fruit. We have to guard very carefully against the fruit moth; the egg it deposits hatches in two days, and the result is our fruit is wormy before we are aware of it. All sun-dried fruit has to go through a heating process to kill the worm, or the miller, whatever it may be, in the fruit. It won't keep any length of time; you can't depend on any sun-dried fruit, and if our fruit remains in the drier when it is not hot enough or tight enough to keep the little miller away, you will have the miller from the drier. We are troubled wonderfully in that way, and have to be very careful; whether it is so all through the State I do not know. We take our fruit from the drier, if we can, before the drier is cool enough to allow the miller to pass through it, and put it in boxes, or barrels, or something tight, and cover it up tight to keep them away. If we can keep the millers out, the fruit will keep an indefinite time, I don't know how long. We make some very nice fruit, and more of it should be made, and there should be a combined effort to put this on the market. Of the dried fruit very little more than what is actually needed we can sell, and unless we can get paid for handling and drying it, we cannot do it. Drying is one half, and making a market is the other half, and it is very essential that we should understand both.

Mr. Killom: Next to fruit pests, I consider this question of fruit drying the most important to the fruit men in California. Here in California we can't tell when it is going to rain. The best sign I have in custom is to look off to the northwest, and see the sign of rain, and presently the rain will come up from the southeast. We can't tell whether we are going to have a sunny fall, or whether the clouds will come over us and hide the sun, and hazard our efforts to dry fruit. I have seen, during my short residence in California, one season when one locality there was one hundred and fifty acres covered with grapes drying for raisins, and there was thousands and thousands of dollars at stake, depending entirely on the fogs, and the clouds came over it, and there was a great loss. And what was not rotted was carted and shipped off to the Mojave or Colorado desert, and there dried. Now we can't have everything in one country. I have heard a great deal about this place, and I had got the idea that everything was pretty near fertile. Santa Barbara was known years and years before I ever saw California. I have had a friend come down by the ocean and stay for her health, and it never occurred to me that there were any faults in Santa Barbara; true, I knew it was right on the seacoast, but I did not suppose the invalid would come two thousand miles to a place where there were any fogs. This is my first visit to Santa Barbara, and with the two days' experience we have had here, I would say the climate is very soft and very mild, but I find this same difficulty is encountered here in drying fruit by the sun. The sun always will come in, and reinforce us in our efforts to dry, but so long as we depend upon the sun in California to dry our fruit, we run a great hazard, and will incur, from year to year, great loss; hence, our fruit must be dried in some way by some of the driers that are invented that will be cheap, that will be simple, and will enable each farmer to dry his own fruit, using the sun when he can, and when the sun is obscured, using the drier. This is the important question, because the fruit is shipped East, and the more water we take out of it the less freight we have to pay.

Mrs. Parker: I have had some little experience in the past seventeen years drying fruit. The first year we had apples to dry; I worked very hard to dry them nicely, and was very proud of them; they came out very nice, and I took them down to the market and they offered me three cents a pound for them; that cured me of trying to dry apples. Then my son had a large quantity of apricots, and my husband built a large drier, and my raisins that we put up received the first premium in Los Angeles, for the best raisins—that was in 1877. We have had a good deal of experience, and I find they all come to the conclusion in marketing fruit, that the plan of sulphuring, as Mr. Goepper, of Santa Ana, has asserted, is about the safest plan. It seems to keep the flies from them, but I cannot say that I would like to buy sulphured fruit for my own use, notwithstanding it may be equally good for them that like it, but I am not fond of sulphur. It is very disagreeable, but we have to prepare something to keep that miller away. I remember I dried, partly in the dryhouse and partly in the sun, some very nice peaches. I was proud of them, and put them in a box, and did not think but what if I kept them covered up that they were safe, and the commission merchant came to our house and asked me if I had some peaches; I told him that I had some that were very nice, and I went and I got them, and there was the worm. I was perfectly astonished, because when I put them there ten days before they were free from worms. He told me then something which I have remembered since. He asked me, "When do you put up your dried fruit?" and I told him when it was convenient; he said, "Put your dried fruit in the sun hereafter, and take it up when there is very warm sunshine; keep it covered up nights, and when you come to put it away for sale, take it up when the sun is broad and clear and you will have no trouble if it is properly dried." So I tried that for three years, and I have dried peaches now in the house that are just as free from worms as they were the day I took them up, and I was very careful to take them up when the sun was shining very brightly.

Mr. Gregg: This little miller, of course, is the dread of all fruit driers, and has been so for some time. Every one who dries fruit finds it out by more or less becoming wormy, but I have succeeded this last year in keeping the fruit entirely free from worms in a very simple manner, which I am going to continue—it is by the use of sulphur. Our warehouse is 35x50 feet, ceiled inside, with only four doors, which shut tight; and every Saturday night we burn about five pounds of sulphur. We have a kettle standing in the middle of the room, and we have sometimes several carloads of fruit in the building, and we fill this kettle about half full of dirt, and every Saturday night we burn about five pounds of sulphur, and shut the room up perfectly tight. Monday morning we throw open the doors without entering, for it would be almost death to the man that would go in at first; we throw open the doors and let the room air. In this way the millers have not affected the fruit at all, and it has even killed mice, and any millers, or moths, or worms that may be there are killed. As to sulphuring fruit for bleaching—it is not bleaching really, it is holding the color—I think it does not hurt the fruit a particle for eating; I would just as soon eat fruit sulphured properly as I would fruit which is not; in fact, I would rather do it, especially apples. Apple sauce made from the dried apples tastes much better if it is light than if it is dark, and I do not think you can taste the sulphur one particle, unless you put it into it. My plan, instead of getting the sulphur on coals, which I object to, is to take house lining, and tear it into strips about a foot wide, and dip it into melted sulphur, and hang it on one end; and when that side is dry, put the other end in. In using it you take a piece about eight inches square for sulphuring fourteen trays, which are in a tight box, and that will hold the color of the fruit as it ought to, but I defy any one to taste it. The trouble is burning on the coals, as a great many do, that the fumes from the charcoal help to taint the fruit, but it will not do it just using the house lining.

Mr. Cadwell: I have seen fruit sulphured so much that you could detect the smell of sulphur in the fruit when it was cooked, but if it is properly done, you can't taste it. I think you are more likely to taste it in apples, perhaps, especially if they are overripe when put up. Apples are better to dry just as they commence to mellow—mellow apples have not got the flavor—then is the proper time to dry apples; it takes very little sulphur then to keep their color and flavor, and it makes the finest of evaporated fruit. I have injured some fruits by applying sulphur, that is the first of my experience, burning sulphur in the drier while the fruit was drying, bleaching only a little of it. I found that the fruit that was warm and partially dried retained some of the flavor of the sulphur; I soon learned that, and now I never allow any sulphur to go into my drier while the fruit is drying. I always like to have the fumes of the sulphur touch it fresh, and then put it in my drier—I don't want any sulphur in my drier. I don't, as it would affect the fruit when it was dried, properly cured, and put in boxes, but I should have my fears about it if there was much moisture in it, of putting the fumes of the sulphur so strong, I should be afraid it would taint it more or less.

Mr. Gray: When the fruit is dry it takes up no sulphur; there is no danger, you might burn twenty barrels, and as it is dried it does not affect it. It only takes up the fumes while it is green.

Mr. C. M. Opdyke: I have had some little experience in drying fruit. I have never used any sulphur because my wife told me not to, and after I got my fruit nicely dried, I took two sacks, one a common barley sack or flour sack and the other a paper sack, and put some in each; those in the paper sack came out just as good as they ever were; I never got any with a worm in it. Anybody that will try that, if they will put their fruit in paper sacks, they will have no difficulty with worms afterwards.

Mr. R. C. Kells, of Yuba City: I have had a great deal of experience, especially the last few years, in drying fruit in the northern part of this State. I have watched carefully, and made up my mind that the bleaching process was an advantage, especially in the outcome, and I did not see as it was any disadvantage to the fruit. I commenced bleaching last season, bleaching all my apricots and peaches, and got good prices; we have the sun for drying, and don't try to use any patent driers at all. It seemed to me in the beginning that sulphuring was an objection; but come to find out, in Georgia they have been bleaching peaches for over twenty years, and have good market for their fruit every season; consequently it proves to me that sulphuring is no damage to the fruit. As to keeping the worms from the fruit, I cannot say that it will keep the worms from the fruit, unless the fruit is taken up at a certain time in the day, the middle of the day, as the lady has spoken of; fruit taken up at that time of day, and put into a room where it can be spread four to six inches deep on the floor, and the windows and doors screened, so that the fruit can be properly stirred every day, and sometimes two or three times a day, the fruit will cure there, bright, soft, and pliable, so that it goes onto the market with a very nice appearance, and brings good prices. That has been my experience in sulphuring fruit the last two years, and especially this year. One of my neighbors had in the neighborhood of about six or seven tons of dried apricots and peaches this year, and had a large room 24x24, I think, and had the doors and windows screened; and at about the middle of the day he would take up his fruit and put it on this floor. He had long wooden shovels, or boards, shaped like a paddle, and he would go in there two or three times a day and stir it up so that the air would pass through; he had the windows raised so that there would be full circulation of air; and no flies could get in; and I bought this fruit, and paid very close attention to it as it went onto the market; I wanted to find out what price it would bring. The consequence was it brought finer prices, it kept in better condition, was free from worms until it was sold at retail, and brought from 2 to 2½ cents a pound more than any fruit I bought this season. It went in better shape, did better, and looked better, than any fruit I ever saw. So far as I have learned, and from others who have paid close attention to it, take up the fruit in the middle of the day. I have never tried the process of taking up the fruit when it is two thirds dry, and finishing it in the room, but I think it is a good thing, and would be good for those who are drying fruit in the sun; if they have not time to finish it in the sun, to put it in a room when it is partially cured and finish it.

Another thing comes to my mind, as to the sulphur being an injury. You take a silver spoon or knife, or a steel spoon or knife, and leave it for forty-eight hours, and the sulphur in the fruit that has been cooked will not color the spoon as much as an egg will in an hour. And I was also informed by a practical physician, a man who is a thorough chemist, that that was the case—that he could testify to that from his experience—that fruit which had not been bleached over half an hour—that he had some fruit where it had been subjected to the sulphur for half an hour—and he tried it with steel and silver both, and it didn't color the spoon as much as an egg would in an hour.

Mr. Opdyke: I would ask the gentleman if seedlings are easier dried than grafted fruit?

Mr. Kells: I could not say as to that. I will say that fruit bleached will dry in two thirds the time that fruit that is not bleached will.

A Delegate: I would ask as to whether fruit dries better on the ground or raised off of the ground?

Mr. Kells: That is a question I put to Dr. Jarvis, of Riverside. He said that lying on the ground was the best, and my experience in drying raisins has taught me that that is correct. Your tray is lying on the ground during the day, the ground heats somewhat, and at nighttime they are lying on the ground, which retains the warmth, whilst being above the ground—six inches or a foot, whatever it may be—the cool air passing under naturally cools the fruit off, and it takes it one third of the day to get warm again, whilst, lying on the ground, the ground retains its warmth and the fruit continues drying.

Mr. Gregg: In regard to dipping the French prune in brine, I very much prefer a light syrup. Take a light syrup of granulated sugar and water, it will kill all the eggs of the moths just as well, and then when you come to cook it you will have something that goes better with the French prune than brine, even if it is weak; and, besides, gives them a gloss that you cannot get with a brine. We put up quite a quantity of French prunes last year, and I defy any one to bring out anything that will look better than they do now. We dip them in this hot syrup and then press them right in the tin cans while they are hot. Speaking about the time fruit will dry in the sun, we dried apricots last year in two days and a half, and there are not very many driers will do better than that. You can do it in the Sacramento Valley, but not where you have fog.

Mrs. Parker: I would like to find out if there is any person that has experience in drying figs, and what that experience is?

Mr. Gray: We never have had any trouble to dry the common California black fig. We have not dried the Asiatic yet. By dipping them into a quite strong lye, and then rinsing them so that the lye cuts the skin, they will crack and look white in spots; then put them out in the sun and press them out. Do not let them lay too close together; you do not want to pile them up at all in the sun. I think the greatest trouble is in allowing them to be out too long. Figs do not want to be dried so that they will rattle, they want to cure instead of dry, and they will cure in very much less time than one would think, although the moisture must be taken out. The only failure we have had was in drying the first crop. We failed entirely one year, took them up when we thought they were about right, but there seems to be more moisture, or a different moisture, in the first crop than the second. We usually have a light first crop, which we use up green or don't use them at all, and the second crop is generally dried without any trouble.

MR. HEATH: In my early efforts as a fruit raiser in this county, I found that fruit was going to accumulate on my hands, and I must find some means of saving the fruit. At that time I was not aware of the existence of any fruit drier in this State, and visited San Francisco, and could obtain no information at that time in regard to fruit driers. I wrote East, to acquaintances in New York State, and the information I obtained was very slight. All these patent driers that I have any knowledge of were not in existence then. On the coast here, we cannot dry in the sun, because in our brightest days in September, by three o'clock the moisture has appeared in our atmosphere so much that the fruit ceases to dry, and it is eleven o'clock in the morning before you can begin, although we are in almost perpetual sunshine.

My first experiment was crude. I started in a wooden building set upon a foundation of concrete, with a cellar eight feet deep; a series of driers above, the smoke having been taken up by a plate of iron above the fire and conducted into the chimney, leaving the heat to pass through the plate of iron and from the plate of iron up into the driers as I constructed them. Well, being ignorant on that subject, I commenced my fire in my oven; I had provided no draught of cold air above that iron plate; it did not occur to me that I must supply something to dry with, but I must have the fire and heat that plate; and I did heat it to the extent almost of melting a cast-iron plate half an inch thick. My fruit didn't dry; I was puzzled. I worked for several days and took a crowbar and went down, and above the plate of iron I knocked out two bricks so as to let in the cold air above the iron plate that was being heated by the fire, and took a handkerchief, for I wanted to see the effect of letting the cold air in. I held my handkerchief up, and presently the end of my handkerchief went in above the plate; then it was that I discovered that I must have a draught of cold air to heat to dry my fruit, and I immediately put a flue above that place. This little drier was small, only had a capacity of a dozen trays about three inches deep and about three feet square, because it was an experiment, and from that I decided to build a larger drier. I took out the bricks to the extent of a foot square and put the fire in my furnace, and the first thing I experimented with was the greenest fruit I ever dried, and that is figs. I must say that it was a perfect success. I used the little Naples fig, which I consider the choicest of the varieties of figs that we have for drying purposes in this State; the fruit is small, and when the stem commences to bend, I pick the fruit and set the figs on the trays with the blossom end up, because the sugar of the fig if placed with the blossom end down will, when heated, leave your fig and you will lose its flavor. In that way I succeeded in drying the fig to perfection, but in my experiment originally as it was, I burnt up my dryhouse because it was imperfectly constructed, and not being discouraged in that matter, I rebuilt that same building 18x33 feet, of brick. In that old drier I built a partition wall one half of the size of the original cellar, the whole size being about 16x33 feet. I cut that in two in the middle; I obtained a furnace, placing the furnace within the wall when it was constructed so that I could apply the wood from the outside without opening the heated chamber inside, as my trays were designed to be opened above my heated furnace, separated from the colder air, there being two sections of the drier above the heated furnace inside. For instance, this would represent the cellar part [illustrating]; the furnace was in the center of the building, and the wood was admitted here without opening this door; the forepart being an air chamber for heating purposes. In the wall itself I pierced two holes of a foot in diameter, and made caps so that I would regulate the admission of the cold air by either putting on or taking off. Above that air chamber I arranged to have the drawers eighteen inches above the floor; in the floor itself were traps where the heated air would pass up from the air chamber below right up into a flue, and on the outside of the trays it was boarded with tongued and grooved lumber, so that no heat could escape in the drying of the fruit. The air passed up into the drawers and out through the flues made of tongued and grooved stuff, up into the ceiling above, so that in the heating process the heat passed through the entire trays, six in number, and passed out over the ceiling of the room above, which gave no heat in the working room of the drying house.

That worked pretty well as a second experiment, but I soon learned that there still was a defect. I speak of this matter, because it may be of interest to you if you build driers. I will give you a description of my present drier, which I consider as near perfection as any drier in the State. It is not patented, it is of my own getting up; I consider that I would do an injustice to the public of this State were I to patent an idea for the drying of fruit, so that you are perfectly at liberty to build a drier on this plan. This drier was a partial failure. I could dry apples (cut in quarters) in three hours; so far it was not a failure, but nevertheless, it was not successful, and I soon learned that that drier had to be changed. I then went to work, and wherever I saw a defect, I remedied it. The first defect I found was, that although I had air spaces below in my air chamber, there was no chance for the escape of the hot air nor the admission of cold air except through these apertures, which I left on purpose. The result as I then had it constructed was, that the supply of cold air into the air chamber in the cellar was not sufficiently large to supply the heated chamber to dry my fruit, and that I was receiving from the loft above a current through a part of the section of my drier; that the cold air was coming down instead of hot air rising as it ought to. I enlarged the apertures below, but never overcame that difficulty in my old drier, so when I commenced the drier I have at the present time (about the size of this building), with an air chamber the whole size of it, and furnace sufficient to heat a drier of that size, I resolved to try other experiments to remedy these defects, and instead of having each section by itself—there being one hundred drawers of a capacity of a half bushel each—and the sections are composed of four drawers high instead of six, the first drawer being about as high as would naturally be convenient for a man to stoop in taking out the drawer. Each section of the drier has its partition perfectly tight, as each section joins the other section. In the rear there is a partition, so that when I operate this section of drawers, it does not interfere with the section on the opposite side, because there is a division between the two, with a flue for the rear drawers, which I will explain as I go on. Instead of having the flues independent, I adopted this plan: on the top of my drier is a space fifteen inches wide and thirty inches high, and in the center of that space there is a partition running lengthways of the drier, being sixty feet long, and each one of the flues of the drier comes up into this open space and then passes to the center of the drier, where is the only flue for letting off steam from the entire trays. By that means, if there were any cold air to come down that one flue, it would come down through the entire drier, and not to one section alone. Now, when the drier is full of fruit and the furnace going, I had apertures in the cellar below which had no connection with the inside of the furnace, because the flue in the drier below is the same size as the drier itself, so that I had a capacity of the whole size of my drier below the floor, to admit the cold air, consequently I could draw on that supply in any place for my drier, as each section is separate. I could use a section in this corner and a section in that corner, and draw upon the common stock of heated air, and I had no trouble in getting the heated air in any particular section, the drier being divided into sections.

I had experienced another difficulty in my old drier; that was the heated air coming in contact with the first drawer; the steam from that drawer of fruit must pass through the drawers above that before it could pass out. The Alden process is built on a plan that is exactly contrary to nature. That is a pretty broad assertion, because the Alden process is considered to be *par excellence* in this State, in that the fresh fruit is always put in the lowest tray, and as it dries it rises until you take your fruit out, generally in the second story. When you dry a garment of any kind you are not very apt to put it into water, because you must extract that before the garment can be dried. Now, in putting the fruit at the bottom, don't you see you are not getting rid of the steam of the fruit? It is the steam of the fruit that you want to evaporate in drying, and the steam must pass through every successive drawer until you get at the top, and to overcome that you must supply a sufficient degree of heat, as that is the only possible way you can get rid of it. Every time you put in a new tray you add new water to your fruit, and if the Alden process had commenced by putting the fruit on top and taking it out at the bottom, then I say it would have been according to nature. I put my fruit in only four trays deep; I would not add to the number of trays, for the lower tray is sufficiently high and sufficiently low to make it convenient for a person to take that tray out without too much labor, and the fourth tray is as high as he can work without getting up on some bench or stool. I also found that when the fruit in the lower drawer was comparatively dry, or drying, that the top drawer was scarcely heated; that, as a matter of course, I had to remedy, and instead of having my register, as it was the whole size of the drier, in the floor under each section—instead of having all the heat pass up under the first tray, I put a division half the size of my register under the third, and passed one half of the heat back of the first two drawers, or the lower drawers, and let the heat escape on top of the second drawer, so that I got one half of the fruit heated directly from the air-chamber below, and my third drawer got just as much heat as my lower drawer, and I could not discover, after I made that improvement, any difference in the temperature, because the additional steam that came from the first and second drawers was overcome by admitting one half of the heat from the register over the second drawer; and in that way I could regulate the heat; then I left sixteen inches between the top of the upper drawer and the top of my drier, and that took off the heat and steam from the fruit itself. Near the top over each section I placed a board, fastened to an iron hook that formed a damper, so that when I closed that damper over the section of fruit, I held the entire heat of that section upon the fruit itself, and there was no manner of escape for the heat or steam; and according to the amount of space I left at the end of my damper, I regulated the draught of the steam I had from those four flues. That is my present drier. In that drier last year, in drying the entire crop of a large orchard, I used but twelve cords of wood for sixty days in succession.

A Delegate: How much fruit did you dry with that twelve cords of wood?

Mr. Heath: I dried seventy odd tons of walnuts; the amount of apples and other fruit I don't recollect; but I kept up to the capacity of my drier for the sixty days, and this year I am going to double the capacity by building another of the same size.

With regard to prunes something has been said; it is a very difficult fruit to dry. I take them after being dipped in lye, the usual way of softening the prune, and then washing it in cold water and leave it in the drier three hours; in that time the prune would become plump; the hot water itself would expand the prune to its utmost capacity, and little could be then gained, so that I adopted the plan of taking the fruit out and opening the doors in my dryhouse and allowing the current of cold air to come in through the trays, and drew out the trays, and exposed the fruit to the cold air; then in twenty minutes' time the prune itself would shrink, the steam would pass from the prune and it would shrivel; the pores of the skin would open, and when once shrunk it was prepared then to shut your doors and you commence your heating process for another two or three hours. In this way I tried four successive coolings of the fruit, and found that four successive coolings of the fruit added greatly to the evaporation of the water from the fruit, and in that way I obtained a perfect dried prune in twelve hours, which I consider a very reasonable time in drying thoroughly and curing prunes; and in drying and curing the prune I must call your attention to one fact; you must not be deceived in regard to this matter, because there are a great many conditions in drying various kinds of fruit. You dry your prunes dry, so that there is no mistake about your evaporating the water of the prune, because you must get rid of the water; then you pile your prunes in piles for four days, and in thirty-six hours you will find that although your prunes were brittle and dry, that the moisture has accumulated to such an extent that you begin to doubt really whether the prunes are dried or not. The fact is, that your prunes are undergoing a sweating process which must necessarily take place before you can pack those prunes with success. If you pack them without going through that sweating process you are liable to lose your fruit, but let them pass through that process for four days, and at the end of that time you will find that the moisture of your prunes is gone, and your fruit returns to its original state of dried prunes.

If you desire to pack them for the market, you take a few pounds of prunes and set out to make a syrup to pour over your prunes; that adds a luster, nothing more; it does not add anything to the value of your prunes; it simply makes them attractive to the sight, and enables you to sell your fruit in the market, because it is glossy like the French prune. You pour that over your fruit, you dry it sufficiently to dry the syrup, for your fruit is already dried, and the gloss is what you obtain; and if you put it in a box where no moth can enter, you have the French prune as pronounced in the city of New York, from my own experiment, equal to anything imported from France.

In regard to the moth I have this to say: that the moth exists if you sweat your fruit, or allow it to sweat before you pack; and if you pack in boxes tight, and first take the precaution to place a piece of paper an inch wide on the openings of the box on the ends and on the sides, you may be sure that you will keep that fruit for three years without any moth. That is the process I tried, and sent the result to New York and had it examined by experts, and they pronounced it equal to any of the French prunes.

Mr. Kells: What is the size of your drier, the cost, and the length of time that it requires to dry prunes, or apricots, or peaches?

Mr. Heath: The cost of that drier may be made according to the fancy of the builder. My own drier is built rather after an expensive style, but there is no reason why a small drier on this same plan cannot be built within the means of any fruit grower, although he may not have an orchard of over five acres. You can put your chamber in the earth, and can build of rough boards if you like. You gentlemen are going to Mr. Cooper's place, and his drier is patterned after mine, excepting this thing: that is a cheap drier, and can be made of any size, to cost from $50 to as much more as you like. He has built his so that the outside of the drier is exposed to the air, which saves the expense of making a building to inclose your drier. I do not approve of that plan, because in opening your fruit you expose it to the cold air, and you lose too much heat from your furnace below. If it is in a house you can close your doors and prevent a draught of cold air; so that you may have your drier of one section of four drawers; it would not cost you $25, with a common box-stove, which costs you $12. The heat from my furnace is conducted through pipes eight inches in diameter, of No. 14 iron, so that I get the heat of the entire furnace below; of course my furnace is in the center, and my chimney is at that end; the pipe commences out over yonder and comes to this part of my drier, passes around until it comes to the other side, and my eight-inch pipe continues until it reaches the further end of the building, and there passes into the chimney; and when I have my drier up to a heat of 150 degrees, I can put my hand upon the pipe where it passes into the chimney, and see that it loses no heat. That is one of the requisites in drying fruit—that it is not made at too much expense.

Mr. Cadwell: I have a drier somewhat similar to that of Mr. Heath. The air chamber is eight feet wide, four feet and a half high, and sixteen feet long; it is in three sections over this air chamber, with an opening of seventeen inches square, letting the hot air into the sections; my trays are three feet square, and sometimes I have eight, ten, and twelve trays, one above the other; that is about enough. I fill my drier from the outside; I prefer it; I like to work in the open air. I have three trays to each door, and open a door and put in my trays from the outside, and the section being four inches longer than the trays, I begin at the top and put in the first tray flush clear back to the back side of the section; the next tray comes forward so that the door closes against it, and so on, to leave a space between the trays where the heat passes back and forth. I have the flues closed through all the sections that are not in use, so that I can use one or more sections as I please. I fill my section; I don't wish to fill it rapidly, but fill the sections, and when I get the sections full the fruit is beginning to cure well on the surface, and then I shut off some of the heat; of course it is warm at the bottom; I shut off some of the heat and go to work at another section. My drier works well; we have no complaint to make; it is handy to use. It is higher than the drier last spoken of; we have to go to work a little lower to put our trays in, and as we go a little higher we must have capacity, and to go over so much surface increases the cost very much. We can dry ten trays in our section very well, and we do not have to reach too high, for it is so I can get my hands on the fruit, and can always tell how the fruit is doing, and can regulate the heat by my hand; still, if we could dry our fruit as they do in Fresno, we had a great deal rather do it.

Mr. Gray: We put up a few pounds of glaced fruit this season. I don't know whether it was done in the manner that they put it up for market, but running a cannery in connection with the orchard, I experimented with a few pounds. I made a fruit which is very good to eat indeed, although it does not compare with some others in appearance. We simply processed it in the cannery in a very heavy syrup, just as heavy as you can dissolve sugar in water. It was allowed to stand about a week in this syrup, when it was taken out and drained, and then put into the drier on wooden slats; it would not do to put it on iron and dried; and when it is taken out of the drier, granulated sugar is sprinkled over it, so that it would not stick together. Then after it had become cold, we put it into an oven on trays, just enough to melt the granulated sugar so that it kind of makes a glistening coat over the fruit, and then I think the proper way would be to take a very little pulverized sugar and put over it. The longer it is kept the better it is. At first it is rather tough, but if it stands for three or four months, the sugar in the fruit granulates, and it will become rather brittle. I know it is good to eat, but whether it is anything that would find a ready market or not, I am unable to say. We do not make enough to sell. I have got a few samples I am keeping to see how it works with age. We tried some peaches, apricots, and pears; the pears were rather tough, and did not succeed as well as the peaches. The best we made were from the orange cling peaches; they were very nice.

A Delegate: You cooked the fruit in the syrup and let it remain in the syrup after cooking?

Mr. Gray: Yes, sir; that is to let it take up as much of the sugar as it possibly could hold.

Mr. Salle: I want to state that the process is one which is very little known as yet among the people of California, and I do not think that those who are engaged in the business are very free to give information about the process, and it is probably also true that the fruit cannot be handled successfully by the individual grower. The plant is expensive and the methods are difficult, therefore the fruit should be handled in large quantities in order to make it pay well.

I think that that is one thing that the growers of fruit in California should look to—some method of handling the fruit themselves. And while I am on the floor, I would like to say in connection with fruit drying, that in Santa Ana Valley and other valleys in Los Angeles County, many fruit raisers have their trays for drying fruit put away in the shed, and they have a little plat of ground upon which they spread them when they are drying, and they have also a little row of stakes or wires stretched on each side of the plat of ground, upon which one tier of trays is put, and the wire is stretched over the second, supported by posts to hold the cloth with which they cover the fruit at night. The cloth is strung on these wires with rings, and in the morning it is drawn back to one end, or the both ends from the center, and the fruit receives the sun. At night the cloth is pulled along the wires, stretched over the fruit to protect them from the fog, and in case of rain they are protected also. When the fruit is nearly dry (as was stated in the essay), they are finished in the drier as usual. The grapes are dried in this manner, and when they are nearly dry, in some cases, they are carried to a large drier and finished. The packing of the fruit is not done generally by the individual driers, especially the grapes. They are sold in what they call sweat-boxes, to the packing houses, or to the men who carry on the business of packing fruit; but it is a very mistaken idea for individual fruit raisers to depend upon the large companies or driers to do the work for them in the way of drying and canning fruits. I think that every individual fruit raiser should have it in his mind to take care of his own fruit in some way or other. With this system of trays they begin in the spring or in the early summer to dry the apricot, and next they dry their peaches, next the prunes, and last their raisins; so that the farmer can be kept all summer long on his proper fruit, if he has got it diversified as to varieties.

The Convention here adjourned until the following morning at half-past nine o'clock.

THIRD DAY'S PROCEEDINGS.

Santa Barbara, April 11, 1888.

The Convention reassembled, pursuant to adjournment. President Cooper, in the chair, announced the subject of the morning: "Citrus Fruits, Everything Pertaining to Citrus Culture, and the Disposition and Sale of Fruit."

PROPAGATION OF ORANGE TREES.

Essay by M. Baldbidge, Azusa.

Some time ago your Secretary informed me that I had been selected to prepare for this occasion an essay, "How to Propagate Orange Trees," and in order to achieve brevity in doing so, I shall present such facts only as have come to my knowledge. Do not expect me to cover the ground as fully as might be desired. I have been in the business only five or six years, and have only learned just enough to enable me to realize how little I know about it. Besides, it could not be done in such a paper as could be read before this meeting. I shall not consume your time with theories or references to text-books or consular reports. You can get what there is in them at home, and at your leisure. Neither shall I attempt a formula, and insist that it apply to all places and conditions alike. I propose to treat the subject in a very plain, practical way, and if I repeat much of what I have said at various times before our county society, it will be because my results have been so satisfactory that I would not change my methods.

The propagation of orange trees necessarily involves the conditions requisite to make a success. As this is the foundation upon which we propose to build, great care should be taken to make no mistake here. It takes too long to correct it. It is a well known fact that certain vintages will give a flavor and bouquet so much superior to other localities that money will hardly buy them. Certain localities only will give the most delicate aroma in tobacco, tea, and coffee. Many of you are, no doubt, aware that the nurseries near Geneva, in central New York, sell trees to all parts of the East. There is reason for it. The conditions there furnish the material to make a better tree than those grown in most other localities.

Now, when you begin to make your programme for propagating orange trees, the first thing to be considered is the selection of such a place for your seed-bed as will combine all the elements necessary to give a strong and healthy plant. Time and money would be well expended in visiting many places, and noting where the best trees are grown, and the conditions obtaining there. In this way you get a practical working test, which is better than an analysis of soils. I would select a rich chocolate marl and fine sand, with just a little reddish clay in it; not so much that it would get stiff with irrigation. This will give you an abundance of fine, fibrous roots. If you plant in heavier land you will get a heavier tap-root, with so few fibers that the tree will suffer severely in transplanting. Plow deep, and pulverize well. A light dressing of ashes well mixed will discourage the worms, which are sometimes troublesome. Lay off the grounds, and make beds say fourteen by forty-two feet, with narrow walks all around them. Use the spirit-level, so that water will stand the same depth on every part. Put up earth from four to five inches high on the borders.

We are now ready for the seed. In man we recognize such a thing as inherent constitutional vitality, or "life principle." In animals we propagate with reference to it. The same thing obtains in the tree family. So far as my own experience and observation go, I am satisfied that stock grown from Tahiti seed will inherit this life principle in larger measure than that produced from any other source. A very large proportion of the trees in market are raised from "California windfalls," because they cost nothing. They are raised to sell, and only an expert can tell the difference. As to the "sour stock," which propagates itself in Florida, and is being used here to some extent, some years will be required to determine definitely its value. All that has been planted in this locality has a rather pale, yellowish color which I do not like. I very much prefer the deep, dark green, as indicative of a stronger life. All other "sour stock" has been fully tested and rejected. Lemon and lime promised well for a time, as the continual flow of sap would push a bud faster than the orange, but latterly the verdict against them has been unanimous. While I would not discourage experiment in any direction, I would rely upon stock grown from Tahiti seed until better results have been fully established for something else.

TO OBTAIN THE SEED,

Go to any importing fruit house and ascertain when they will have a cargo of oranges from Tahiti. Many of them will be decayed. Have a man there to select the largest, pack them in barrels and ship them in pulp. When they come to hand, wash out and plant. Do not permit them to dry. Cover nicely, say one half to three quarters of an inch. Now, cover the whole bed with clean sand one inch, as you cannot cultivate and must irrigate while in the seed-bed. This will keep the weeds from starting and the ground from baking. A barrel should give fifteen hundred to two thousand plants. Now put up posts and stretch bale-rope to represent ridge-pole and plates. Cover with very thin cotton cloth. This will protect the young plants from the sun and permit free circulation of air underneath. Irrigate always before the plants begin to show that they need it.

The month of May is a good time to plant. At about the same time next year transplant the nursery.

Have the ground thoroughly irrigated and well prepared. Plant far enough apart for convenience in cultivating, and a foot apart in the row. Bear in mind that you must have sand and marl with but little clay to furnish the mass of fibers you will need when transplanting to orchard. When growth conditions are well defined, put up a tent to protect fibers from sun and wind while handling. Make a box with one open side, face that side north, take up about a hundred and carry to the tent and assort into first, second, and third, and grout and heel in until the planters come for them. Let them take in a similar box about the same number. Plant with dibble, taking care to close solid around plant at bottom. Handled in this way, all should live. They should not even lose their foliage, and the growth which has just started should come on pretty much the same as if they had remained in seed-bed. Now, irrigate just enough to furnish requisite moisture, and cultivate so thoroughly that weeds will have no chance to start. Do no pruning except to keep the way open for horse and cultivator for eighteen months.

BUDDING.

If trees have made a strong, thrifty growth, I would set buds in the fall. In my locality I can generally get buds and trees in condition in October. Buds should be cut from vigorous, healthy, bearing trees only. Sometimes several buds should be rejected from the heavy end of a stick, because imperfectly developed, and on tip end they will be too sharp and thin. I prefer to set buds in the fall, as they are then well developed and ready for the February growth.

The most important feature in the budding is the tying. I would just touch with wax after slipping in the bud, before putting on the string. Then be sure the top is well secured. I have often seen buds loose at the bottom, living, while all I ever saw loose at top were dead. I prefer to let the strings crease the bark pretty well before taking them off. As growth conditions come on I cut off the tree about four or five inches above the bud, and cover with wax to keep the wood alive until it is all healed in. When the bud is large enough to carry all the sap, select a period of non-growth and stump off to a shoulder with the bud, and again cover with wax. This cut I would make with a saw, and as nearly level as may be.

Ground should be kept loose in the tree row, otherwise klinker or scoria will form on the bark and originate "gum disease." If this should occur you may save the tree by scraping thoroughly to sound wood.

The method here outlined has given me Washington Navel buds, ten feet high at one year, and with good body and well branched, with a tree taper like a carriage whip, carrying white wood, and rounding cane well to top. Such a bud, with very large leaves and dark green, wax-like surface, furnishes the most conclusive evidence that conditions were good and methods correct.

I use no fertilizer in seed-bed or nursery. The nurseryman or orchardist can well afford some time and money in quest of such trees, or the locality which will in its normal condition produce them. The next business in order is—

TRANSPLANTING TO ORCHARD.

Here, again, conditions must govern. I prefer to do this at one year also, because there is much less top to cut away than at two years old. The second year's growth on such a bottom is enormous, is inclined to mature wood and put on fruit, and has to be cut away if left in nursery, when, if removed to orchard, such growth as is wanted can be forming the permanent top, and the rest can be thumb-pruned away without shock or check to the plant. As trees are to be taken from the nursery in spring, I strip the cane pretty close in early winter, then tip with wax every raw place. It is then healed over, the tree re-covered, and there is not much to do when planting time comes but to cut off so much of the top as would come above your six-foot stake. My trees carry this height nicely from nursery to orchard with stake for support. The first business the cane does will be to clothe itself from the bottom up, and you have a tree at once. I like this method for another reason. The first growth is strongly inclined to be lateral, with a downward tendency. If that is taken off, the next growth will be nearly at an angle of forty-five degrees, and the tree can be readily shaped to carry a heavy load of fruit. This method I consider a very important feature in the foundation of a tree, and never having seen it adopted or suggested in any of the books, I claim it as an original discovery, and solicit investigation. Five thousand such trees planted in my own orchard two years ago will verify what I claim for it.

As to the proper time to transplant, again consult conditions and be governed by them. Seasons vary very much, and it is not safe to name the day, week, or month. When the buds are swollen to bursting, and new growth just starting, that is the time to take the tree from nursery to orchard. If there would be danger from subsequent frost, wait until such conditions are again on, when this growth has hardened. In my locality I very much prefer planting in February. Trees are then well established before the hot weather comes on. I finished transplanting the twenty-fifth of February, and the young growth just starting came on about the same as if trees had remained in nursery. When you find the tree in proper condition, cut it back, and cut the tap-root to hold it there. See that ground is well prepared. Lay it off and secure your force. I would plant budded trees twenty-four feet apart each way; seedlings, thirty. Have everything in readiness before you touch a tree. If a norther should come on just as you are ready, stop and wait until it is over. When weather is favorable, put some of your men to raising trees, some to digging holes, and some to hauling. Cover with wet blankets as soon as out of the ground. If sun is shining hot, or you have far to haul them, I would grout them; but there is so much danger that the grout may be permitted to dry or harden on the fibrous roots, that I would almost be willing to say, dispense with it entirely. I have never yet sacked a single tree, and latterly I have not grouted. I have made a success in packing to haul four miles without it. Sacking necessitates more root-pruning than I am willing to do. If land is deep marl and sand, as it should be, cut tap-roots twenty-four inches, dig holes thirty inches, and set crown-roots six inches below dry earth. I insist upon more tamping than most men are willing to do, but my trees live and do well. I ride no hobbies. I will adopt another man's methods when I see that he gets better results than I do. If a little space is left open anywhere on the tap-root, or the ground is left so loose that the first irrigation will open one, the bark will rot there and all below it is lost. I have two tampers and one shoveler to each setting-board, and dirt is filled in no faster than it can be made solid. I never plant orange trees to get done, never leave a tree until the work is well done. One tamp stick should be quite small to work among the roots. Tamp the bottom solid up to the crown-roots, then cover them and let one man tamp with his feet. A tank-wagon should follow the setters, and give each tree a bucket of water. As soon as the water has disappeared, cover up with loose earth. Now the tree has what is indispensable—something to preserve the old life until the new life begins. One bucket of water at this time is worth more than a flood a few days after. Your citrus tree cannot wait until you have finished the plot.

Now stake the tree and tie it, otherwise the wind will move it back and forth, packing the earth on either side, until a little space is opened around the cane where the air can penetrate to the crown-roots and evaporate the moisture. Put a little straw, half composted, on top, before the hole has been quite filled; put a little earth on it to keep the wind from blowing it away. Now paper the trunk; it keeps the jack-rabbits from eating it, prevents young growth from starting where it is not wanted, and protects the bark from the reflection of the sand; otherwise the south side will be hidebound. Try it with your knife; it will not slip, and you will find free circulation of sap on the north side only. You must protect the trunk from the ground up, until the foliage will do it. Now the work is done. Ninety-five per cent of the trees will live, and make a growth at first growth period after they are established in their new home.

PRUNING CITRUS TREES.

Essay by J. W. Salle, Pomona.

In the matter of pruning trees, as in all other matters of horticulture, there are fundamental principles of nature underlying all methods, and the nearer the method corresponds with the fundamental principles the better the method. Then, the first thing to learn in pruning any kind of a tree is to know the nature of the growth of the tree, and the second thing to know is the object for which you prune.

The orange tree is a native of a tropical country, with abundant rainfall. The foliage is very dense, thoroughly protecting the body of the tree and ground beneath the branches from the sun's rays; hence the roots grow near the surface of the ground. It is, therefore, a great wrong to expose the tree trunk or ground around the same to the scorching rays of a noonday sun.

To secure a good stock to begin with, the seedling should be four years old before the bud is inserted. The seedling stock should be well cultivated, irrigated, and manured, so the growth is vigorous. No pruning should be done to the seedling stock, for the growth of both top and root depends upon the healthy condition of both, and the more abundant the foliage the better. If it grows scraggy, let it grow.

If a seedling tree is desired, cut the top and branches from the seedling stock the winter after the fourth year's growth; allow but one bud to grow the following season. This will grow six or eight feet high, straight, and beautiful. Transplant the following season—*i. e.*, when the root is five years old.

If a budded tree is desired, bud into the best portion of the seedling stock the fall after the fourth year's growth, and cut all the seedling stock away to within six inches of the bud. Allow no other bud to grow, save the one inserted, and in one season this will grow five or seven feet high. Transplant when this bud is one year old. Drive a stake by the tree, and tie the tree to the stake: that is, if the tree is crooked, or too slim to support itself erect. The same instructions for pruning apply to both seedling and budded trees. We have now a beautiful, tall, straight stock to build a tree upon. This straight stock is very important, for without it we cannot make a handsome and symmetrical tree.

If the bud is put into a seedling stock only two or three years old, we will not get a handsome stock to build a tree upon; it will be low and scrubby, and is difficult to prune properly. But in any case, observe the following

RULES FOR PRUNING YOUNG TREES.

Allow all the branches to grow unmolested for three years, at least. Do not pull off the buds which come from the tree above the point of union of bud and stock. Below this the suckers should be removed. The better way, however, is to wrap paper around the tree from the ground up about eight inches. Do this when the tree is first set in orchard. This prevents the suckers and unnecessary buds from growing, and also protects the tree trunk from the sun, and from gophers and rabbits.

If you desire your trees to form a head about three or four feet high, which, however, I do not recommend, you should not pull or break off the young shoots, which will grow thick all along the tree trunk from the paper to the top of the young tree, but allow them to grow until the foliage thoroughly protects the body of tree; say let these branches grow to be about two feet long, then cut off the ends of the low branches, and cut repeatedly as they grow; but at no time cut them away so the body of the tree is exposed to sun. Remember, too, that the more foliage you have on the tree the better will be the growth. If you want to spoil and dwarf your tree, just keep these low branches trimmed off to the height you want the top or head of the tree. Your tree will not grow at all, or but little, for several years, and while your neighbor, who allowed his trees to have their free will in growing, has been getting profits from his orchard, you will still be trying to *make* your trees grow as nature never intended them to grow.

I much prefer the branches to put out near the ground, say about eight inches above, and from that height to the top of the tree the branches should put out at regular intervals from the trunk. The lowest branches will droop to the ground the first season. They will be the first branches to bear fruit, and will bear two or three crops before nature is through with them. These low branches will not grow much after the second or third year, but the growth will be upon branches higher, which, like the first, will droop and overshadow the lower, or first branches. This will be about the third year; then is the time to begin the use of the shears.

Cut away such branches from the bottom and inside of the tree-top as nature seems to be through with, and which do not appear to be vigorous, and are useless in affording either fruit or protection to the tree. It will not require an expert to discover which they are. But in no case cut away a vigorous branch just to make the tree look pretty or to make the top high enough to plow under.

As the tree grows older, the same instructions should be observed. As the tree grows taller and larger, and the towering branches overshadow and dwarf the lower ones, and as these lower ones cease to bear fruit, they may be thinned out. Take a principal branch, for instance, and follow it outward from the trunk, and you will find many small laterals which nature seems trying to choke to death. These are the first members of this principal branch, and in their time bore the fruit and foliage, but now have been superseded by larger and more vigorous ones, and these old ones should now be cut away; but at no time thin the body of foliage so that an open window is left that the sun may shine through upon the inner branches or trunk of the tree.

The tree, when well trimmed, if ten or twelve years old, should present the appearance of an umbrella. The inside branches and trunk of tree, clean and smooth, with a dense foliage on extremities, and the top should come within three or four feet of the ground. But to let the top at all times rest upon the ground is a better way to secure a large amount of fruit, and then, too, no props are necessary, as each branch touches and rests upon the lower one, and the lowest rests upon the ground. In this case the ground never becomes foul or hard under the tree. I like this method best. However, the inside trimming should be done as above described.

Never should there be pruning done known as "heading in," unless it is with lemons. This method is sometimes necessary with lemon trees, as they grow much more rapidly and branch longer than orange trees do, and in order to have them grow stronger, we sometimes "head them in." The same general instructions apply to lemon trees as to orange trees. Remember at all times to be sparing with the shears.

You are sure to dwarf the young trees by too much pruning. If you expose the trunk of a young citrus tree to the sun, the first thing nature will do is to attempt to cover it again, and as often as you remove this covering you injure the tree. And so, likewise, when you thin the top of the old tree to excess.

The advantages of low pruning are these:

First—The growth is much more vigorous and healthy.

Second—The tree will bear much earlier and more fruit.

Third—The fruit is much more easily and cheaply gathered.

Fourth—The tree is better balanced and grows straighter.

Fifth—The pruning is more easily and cheaply done.

Sixth—The wind will have less effect on both tree and fruit.

Seventh—The body of the tree is protected from sun and kept free from disease.

Eighth—The ground beneath and around the tree is protected from sun and not so apt to form hardpan in cultivation.

Finally, it is nature's plan, and you cannot depart from it without injury or loss.

CITRUS FRUITS—PROFITABLE VARIETIES.

Essay by A. Scott Chapman, San Gabriel.

In this matter we must take into consideration the hardiness of the trees in their capacity to resist drought, frost, and insects, and the value of the fruit when grown.

Of all the citrus trees the seedling—that is, a tree grown from the seed of a sweet orange—is considered to be the best to resist drought, frost, and insects, by reason of its hardiness. It grows to larger proportions than the budded varieties, and bears more oranges to the tree, but the fruit of the same will not sell for prices that the fine budded varieties command.

On account of the hardiness of the seedling orange tree, it is preferred for budding upon.

The Washington Navel is the finest of all the budded varieties, and sells for more money, but the tree does not grow and is only a good bearer under the most propitious circumstances, and the fruit is very susceptible to frost.

The Maltese Blood is a more hardy fruit; the tree a more generous bearer. Like the Navel, it is seedless, but has a peculiar flavor of its own.

Azorian St. Michael.—A tree imported from River's Nurseries, in England. Is a large tree, a heavy bearer, and the fruit has the most excellent keeping qualities.

I append hereto, from advance sheets of a treatise on citrus culture, by B. M. Lelong, our Secretary, the following, bearing on the variety:

Valencia Late.—"This variety has, in the last six years, fruited in this State, aud is one of the best varieties grown. The fruit resembles the *Paper-Rind St. Michael* in color and firmness, but oblong, being double in size. Trees of this variety do not commence to bear young. So much in its favor, as most of budded varieties commence to bear when entirely too young, thus checking the growth of the tree. It is a very good keeper and a prolific bearer."

Mediterranean Sweet.—"Fruit medium to large; pulp and skin of fine texture, very solid and few seeds; ripens late. The tree is thornless and of a dwarf habit of growth."

The Paper-Rind St. Michael.—Is a most excellent fruit, somewhat small, of thin skin, juicy, and very sweet.

I consider the *Lisbon and Eureka Lemon* the most profitable to be grown.

THE FUTURE OF CITRUS CULTURE IN CALIFORNIA.

Essay by L. M. Holt, Riverside.

To the President of the State Fruit Growers Convention: I regret my inability to attend the Convention of Fruit Growers at Santa Barbara, but my business interests are of such a nature that it is entirely impossible for me to do so. I intended to be there, and to respond as well as I could to the invitation of the State Board of Horticulture to discuss the question of "The Future of Citrus Culture in California," and to participate in the debate on that question, but matters of a private nature are such that I cannot attend, and they have kept me so busy that I have not had the time to prepare a paper on this subject that would do the question justice.

I desire, however, to call your attention to a few ideas, in a brief manner, for your consideration. The question of where the orange can be grown, is one that has attracted the attention of the fruit growers of California, to a great extent, during the past few months, and this question is intimately connected with the future of citrus culture in the State. There is one idea, I think, that has been entirely overlooked by the public discussions of this question, and that is, that more attention has been paid to the subject of where the orange tree can be grown, than to where the orange fruit can be raised.

California is subject to cold waves during the winter time. There is practically no portion of the State that is free from the cold wave. The question of average temperature cuts but little figure in orange culture, only as the question of minimum temperature is satisfactory. A cold wave that will destroy the crop, will not materially injure the tree; therefore, that locality where the tree can be successfully grown might have such a minimum temperature that the orchard would never fruit in a profitable manner. A cold wave that would do no damage to the tree, and no damage to the fruit, in January, might ruin the crop if the same temperature should come in November, before the orange is sufficiently matured to resist the cold.

In November, 1886, a cold wave swept over Riverside, which sent the thermometer down to 27°, a point which would only cut back the tender shoots of the tree, and practically, it would not injure the tree at all; and yet, the fruit in its immature state at that time was seriously affected. Of course, the mercury in different localities registered a different degree, but at that time there was probably no orange in the valley that was subjected to a lower temperature than 25°.

During the past winter, in January, the celebrated cold wave, which swept all over the State, put the mercury down to 25° in Riverside, two degrees colder than the cold wave of 1886, and yet no damage was done, because the condition of the tree and fruit was such as to withstand the cold better in January than in November.

In neither one of these cold waves was there any damage done to the orchard. In fact, the mercury could have gone several degrees lower than it did, and yet the trees would have sustained no injury of a permanent character.

The question, therefore, for the practical fruit grower to study is, to find the locality for the planting of the orange, where the minimum temperature will be high enough to save the fruit as well as the tree.

There are a few propositions of a general character which are now recognized in connection with citrus fruit culture in California. One is, that the best localities for perfecting the orange and lemon are located away from the coast, in the interior valleys of the State. Wherever the orange has been grown, from Oroville to the Mexican line, every bearing tree, wherever located, has been a witness to testify to the correctness of this proposition. As a rule, all orchards located along the coast have been attacked by the common black scale, accompanied with the black smut or fungus growth, and every orchard located in an interior valley, as a rule, has been free from both. The one invariably accompanies the other, the black smut being the result of the black scale.

The same rule does not hold true as regards some other insect pests. The red scale and the cottony cushion scale are to be found in some central portions of California where the brown or black scale do not exist, although in Southern California it has been confined thus far to the coast valleys.

The markets of the United States demonstrate the fact that the oranges raised in the central valleys command higher prices than those raised along the coast. These interior oranges command a higher price in Chicago than any oranges shipped to that market from any portion of the world. It was these oranges, grown in the interior valleys, that competed successfully with the Florida, and secured the gold medals for the best twenty varieties grown in California, in the United States, or in the world. In making this statement, I do not wish to reflect in the least upon the magnificent display of oranges from San Diego County at the New Orleans World's Fair. It is a well known fact that the line which separates the interior valleys from the coast valleys, so far as citrus fruits are concerned, nears the coast as we progress southward towards the Mexican line, and that only a few miles back from the ocean, in San Diego County, we find as clean fruit as we do further north, twice or three times that distance. It is also true that on the very coast, in San Diego County, clean orchards can be grown for many years, although eventually the scale, as a rule, gets possession of the trees. Hence, we find around the bay of San Diego very fine oranges grown on young trees. This does not conflict with the general rule which places the home of the orange, in California, away from the coast.

The time is coming when trainloads of oranges from California will be shipped across the Rocky Mountains, where now only carloads are sent. It is only about three years since oranges were first successfully shipped from Southern California to Chicago. It was then an experiment; a market had to be made in the Western States. It took time to make it, and yet the market has extended more rapidly than did the bearing capacity of our orchards; and there has never been a time, since the shipment of oranges on a large scale to the Western States commenced, when the demand for good oranges did not exceed the supply. And yet the markets of the northwest are only partially developed, and the east has not been touched at all.

We do not come in conflict with Florida in the orange markets of the north, because the Florida crop is marketed before the California crop is ready to market. Our shipments commence about the first of February, and at that time theirs is practically ended. The Florida crop of oranges comes into market about the first of November, and continues for four months. The California crop commences about the first of February, and continues about four months. Florida has the disadvantage of placing its fruit on the market during the four coldest months, at a time when the public do not appreciate acid fruits. The California crop comes upon the market in the spring, when the system demands an acid fruit, and at a time when there is practically no other fruit in the market with which it is brought into competition.

It is for this reason, and for another reason of actual superiority, that the California orange commands from $1 to $2 per box more in the market than is paid for the Florida orange.

As yet, the supply of the California orange is not equal to the demand, and the supply is not increasing as rapidly as the public generally think. Orange orchard planting has practically ceased for several years past along the coast valleys of Southern California, while it has received an impetus in the interior valleys during the past four or five years. There has been practically no increase of production of oranges in the coast valleys, and it is doubtful if there ever will be an increase in those sections. Hence, we must look to the interior valleys for the orange supply of the future. This supply, at present, comes from a limited area, and the future increase of oranges from those valleys will be slow, because it requires so many years to plant the orchard and bring it into bearing. Riverside illustrates this point very nicely, as is seen from the shipments from that valley during the past four seasons.

During the season of 1884–5, the shipment of oranges from Riverside amounted to about five hundred carloads. During the season of 1885–6, the shipments were about the same. During the season of 1886–7, the shipments did not reach five hundred carloads. During the present season, 1887–8, the shipments to date have reached nearly five hundred carloads, with probably two hundred or three hundred carloads yet to go forward.

The total shipments of oranges from Southern California are not a great deal larger to-day than they were four years ago, and yet, while the increase is slow, it is certain, and in the four years to come we may look for a larger increase than in the four years past, because more young orchards will come into bearing.

The question of raising a superior orange in California is now settled. This State not only raises a superior orange, an orange that is king among oranges, but that fact is recognized by the markets of the United States, and there is no probability that the present century will see enough oranges produced in California to supply the spring markets of the Atlantic States. The Mediterranean orange is being practically driven from the market, while the Florida orange cuts no figure, as it is not a competitor.

Our people are learning rapidly where choice oranges can be raised successfully. Fortunes have been lost in learning this lesson, and other fortunes will probably be also lost in trying to demonstrate the fact that the California citrus belt is a large one. A few will pay heavy tuition to learn these facts, and the masses will take advantage of the facts thus learned.

Cultivation of the orange in favorable localities is probably the most profitable business to which an acre of ground can be devoted for horticultural or agricultural purposes. It takes time to develop an orange grove, and this fact, taken in connection with the fear of over-production, keeps the masses from going into the industry, and hence the time when over-production will come, if ever, is pushed far into the future.

The price of choice orange land in California is yet very low, as compared to the price it must attain when this industry and the markets become fully and thoroughly established. Riverside to-day has three thousand acres of orange groves, which will produce next year one thousand carloads of oranges—an average of a carload to every three acres; and this crop will increase from year to year, until an average crop of two carloads to the acre is reached, or six thousand carloads from the three thousand acres. The crop of these three thousand acres next year will pay $200,000 in freight, an average of $66 to the acre; and when the trees are in what may be called full bearing, they will pay freight at the rate of $600 an acre if the freight rates continue as they are to-day—$200 a carload—while the average net income of the crop now is $200 an acre; and similar markets which have prevailed here for the last three years will pay, when the trees come into full bearing, six times that amount, or an average of $1,200 an acre, this being reckoned as the net price of the crop upon the tree. In fact, single orchards are now yielding that income.

I did not intend to make this paper a document for booming California, but a discussion of the future of citrus fruit culture that left out the question of dollars and cents would be incomplete.

While I am sanguine of the future profits of orange culture, I cannot say so much for the future of the lemon business; and as this portion of the industry is as yet in its infancy, but is being developed in a satisfactory, but a very slow way, I will only give that part of the subject a passing notice.

The very best of lemons can be raised in California. They will ripen, however, at the wrong season of the year, and the only question now for our people to ascertain is, How can the lemon be picked in December and marketed in June? This branch of the subject needs more time than I can give it in this paper.

I trust that your Convention will consider the points presented herein, and refute any that may be considered incorrect.

Mr. Frank A. Kimball: I would like about five minutes to answer a portion of Mr. Holt's essay. He makes the statement in his essay, which carries with it the general impression, that Riverside won fairly the gold medals at the exposition at New Orleans. The facts are these: I, in conjunction with my brother, prepared an exhibit by purchase, of all the fruit from our Horticultural Society, and carried them to the exhibition at New Orleans. Riverside made no attempt at an exhibition until our fruits passed that place. They asked Mr. Earle to make an exhibit and he utterly declined. Our fruits had not passed Riverside one hour when notices were published calling a meeting at Riverside, to make an exhibit of fruit. Their first fruit was packed on the fourteenth of March. The programme of the committee was, that the fruit should be exhibited before the Judges in New Orleans the fifteenth of March. Our fruit was there and displayed ready for the Judges, one of the calls being for the best, not less than twenty varieties of oranges from any place in the world, a gold medal and $250, or $100, or whatever it was. We had thirty-four varieties of oranges to exhibit, and had them on exhibition. The Judges asked us to remove all but twenty varieties. I said, "If the other people would do the same thing, I would do it," which I did. I removed all but twenty. When Riverside came they put out fifty-one varieties of oranges. The Judges went to them and asked them to remove all but twenty, because San Diego County had done the same thing. Mr. Richardson and Mr. Holt utterly refused to do it, in very emphatic terms. Fifty-seven points covers a perfect orange, as insisted upon by the Judges, and agreed to by the exhibitors. They refusing to remove their oranges, they had fifty-one varieties of oranges judged, which should have a possible 2,907 points. They won 2,323 points, we having removed all our fruit but the twenty varieties, the rest having remained under the glass roof from the fourteenth day of March until the third day of April; while not a piece of the fruit from Riverside was picked until after the fourteenth day of March, and was not on the tables until the day before it was presented to the Judges for their judgment, perfectly fresh, while ours had been exhibited at one Fair, transported to New Orleans, and had been under the glass for fifteen or sixteen days. Out of the possible 1,140 points the Judges awarded us 1,069, in point of superiority, giving us 14 per cent over Riverside at its best exhibit, they refusing to compare with us on the twenty varieties. Technically, they were right in insisting upon all the varieties, because they said not less than twenty varieties, and Mr. Bettner said, "If we have a thousand specimens you would have to judge them alongside of San Diego's twenty." We of course only had 1,069 points, and they had 2,323, and consequently they were awarded the gold medal; but if they had the best twenty varieties why didn't they have the best fifteen? I took the silver medal and $75 for the best fifteen varieties. Why didn't they have the best ten varieties? I took the silver medal for that. Why didn't they have the best five? I took the first premium and the $25 for that. If they had the best twenty varieties they should have had the best ten. My argument is, that they should not, because of those medals, won under such conditions—that they should not restrict the area of possible and profitable production of the orange to that locality. Mr. Holt said himself, in my orchard last winter, that there was not the equal of it on the face of the globe. Now, why in the world does he restrict the citrus belt to a little place around Riverside. It is not true; it is not right. I told him to come here, that I wanted him to defend himself, because I should defend myself. In competition with Riverside we did take the sweepstakes for the exhibit of citrus fruits in the State of California. The area of citrus culture is not limited as it is claimed. In the lemon industry it is claimed that they should be picked in December. I claim that the lemon is not fit to pick until March, and from March to June is a short period.

I have a few boxes of oranges that will go from fifty-four to ninety-six to a box, and several thousand oranges on trees only four years old; the equal of it cannot be produced on this globe.

Mr. Baldridge: I desire to say one word as to varieties of lemons, and to call attention to the Eureka lemon and the Lisbon. In my locality we propagate those only, and we recognize them as being about equal in quality, although the Lisbon has a little thicker rind than the other, and the Eureka yields a little greater quantity of juice; but one point has not been noticed, which, in my judgment, gives the Eureka the decided preference: the Lisbon is very thorny, and is more liable to be damaged by the wind.

CALIFORNIA CITRUS FRUITS, MARKETS, ETC.

Essay by Dr. O. P. Chubb, Orange.

The rapidity with which California citrus fruits have, within the past five years, gained a foothold in eastern markets, has greatly surprised not only Florida growers but importers from the Mediterranean. That oranges, lemons, and limes were produced on this coast had, of course, long been known, but active competition in quantity throughout the States east of the Rockies was neither suspected nor feared.

Florida, however, cannot be materially affected by the increasing importance of our trade, since her output is nearly or quite consumed before ours is sufficiently mature to take its place. The only point of contest at issue between these two sister States in the citrus trade seems to be one of quality and beauty, or, in other words, a matter of "*points*," concerning which a committee expressed an opinion at New Orleans not long since. The Atlantic cities appreciate fine fruits, and in this respect there is an opening for our growers to meet Florida in her own chosen markets, and before her season closes. The lateness of California's main crop is her strong hold in those cities west of the Atlantic seaboard. This climatic advantage is an important one, and should be well considered in the selection of varieties for planting, since the later the shipments are made the better the prices obtained (at least such has been the case in past seasons) up to the middle of July, when strawberries and other small summer fruits interfere. The great northwest is, however, capable of absorbing our entire product at remunerative prices as early or late as it is in fair or fit condition to place. The States west of New York and Pennsylvania are depending more and more each year on California for spring shipments of oranges, and the heavier consumption is steadily pushing westward. The people there are all interested in California and her fruit products, and will choose her oranges in preference to Mediterranean fruit of like quality and price.

VARIETIES.

By intelligent propagation of imported varieties and stocks, aided by peculiar adaptation of climate, soil, and methods of cultivation, our horticulturists have developed new types of flavor, pulp, and peel, which western taste is not slow to recognize and appreciate. The Washington Navel stands to-day the peer of any orange known in the market, and is really the autocrat of the price list. Following this winner of gold medals and golden opinions come the luscious St. Michael, the sprightly Mediterranean Sweet, the handsome and characteristic Valencia, and late and various improved selections from the older orchards of seedlings, not to mention the average seedling, of a quality equal to anything grown on the coast or islands of the Mediterranean.

HYGIENIC.

All these varieties, as the product of California soil and climate, possess that happy combination of sugar and acid, of flavor and aroma, which not only pleases the palate, but corrects the bile of the eastern consumer as he emerges from the ruins of a supertonic winter into the malarious tendencies of a radical spring warmth, mixed with the vagaries of an obstinate liver. And so he comes to recognize the California orange as not only the proper thing, but as coming in at the proper time, and he proceeds to put it where it will do the most good. It is a new and popular prescription from Nature's California laboratory, and he cries for it daily. The great and growing cities of the Mississippi Valley are learning to appreciate and consume increasing quantities of this class of fruits, filling the gap, as they do, between the ham fat of winter and the chicken broth and fresh vegetables of the heated term in July.

THE MARKETS.

Chicago alone marketed five hundred carloads of oranges for us in 1887, but our best markets are coming still nearer the source of supply. Not long will St. Paul, Minneapolis, Sioux City, and Omaha, St. Louis, and Kansas City, Denver, and Pueblo, Salt Lake, and Helena, depend on New York or even Chicago for their supply of citrus fruits. With additional competing lines of railroad, speed and efficiency become important factors; low rates and prompt delivery are then subjects of vital interest to common carriers of perishable commodities. "From the orchard to the fruit stand in five days," will constitute the banner of the train, and contracts to deliver at specified dates may yet solve the problem of shrinkage and fluctuating prices. Bright, clean fruit and systematic handling are only requisite to insure a steady demand and profitable return for all the oranges and lemons we can grow.

LEMONS.

Our lemons do not, as yet, compete as successfully with the foreign product as our oranges have done, but the cause lies, in my opinion, wholly with us in our imperfect methods of curing and handling. I have seen California lemons selling at $10 a box in the city of Omaha for short periods, but only because the foreign stock was entirely exhausted. Such as were still undecayed were repacked in foreign boxes and sold at the above named price with no suspicion on the part of the retailers and consumers of the fraud practiced.

During the past winter good prices for our oranges have been steadily maintained, and I have been besieged with personal letters from dealers in Cleveland, Cincinnati, St. Louis, Omaha, and other western cities, asking for shipments, or consignments on commission, and promising returns at from $2 50 for fair seedlings to $6 per box for choice Washington Navels. But the day is past when fine, clean fruit, in good condition, need be risked with commission houses. All that we have to do in placing ourselves upon a permanent basis of prosperity in the citrus fruit trade is to grow good, clean fruit, improve our methods of curing and handling, systematize the transfer and distribution of the crop, and pocket the cash at "free on board" rates.

The Northwestern States and Territories will take care of it all, leaving the Atlantic Coast to be supplied with Mediterranean and Florida stock, excepting when fancy prices for our fancy fruit may warrant a longer haul at a better profit.

Under a perfected system of cold storage and the use of refrigerator cars, such results may be definitely secured as to give us the choice of markets, according to any special demand of the season or locality. This industry is yet in its infancy on this coast, and we may rest assured that the demand for choice fruit at high prices will always remain in advance of the supply.

LEMON CULTURE AND LEMON CURING.

Essay by **Frank A. Kimball**, National City.

Ladies and gentlemen: The discussion of the subject, "Lemon Culture and Lemon Curing," before the Ninth State Convention of Fruit Growers of California, having been assigned to me, I beg leave to submit for your consideration the results of my experiments, and the limited amount of research I have been able to make.

HISTORICALLY CONSIDERED.

The claim is made by some writers that the lemon tree is indigenous *only* in the northwestern part of India; by others, whose opinions, perhaps, are entitled to equal respect, that Assyria alone was its birthplace, and still by others that Persia justly claims the honor. Certain it is, however, that neither the ancient Greeks nor Romans had any knowledge of this fruit; nor yet was it introduced into Spain until the latter part of the twelfth, or early in the thirteenth century, and to the Arabs, unquestionably, is due the credit of its introduction. Late in the fifteenth century England received her first lemons from the Azores, and for a long period her supplies of this fruit were almost exclusively drawn from these islands.

Through the constantly diverging channels of commerce the lemon has been distributed until it is now grown in the entire region surrounding the Mediterranean Sea, in Australia, and various other islands of the Pacific Ocean, in the United States bordering on the Gulf of Mexico, in Southern California—in fact, in all semi-tropic countries, to a greater or less extent.

Knowing the area of its possible cultivation, and the price at which it can be produced and transported to our markets, the question, "Can we grow the lemon at a profit?" comes home to us as an economic one, and in this light will be considered; and if we can demonstrate that we have the soil and climate adapted to successful cultivation, and can produce a larger crop on younger trees, on the same area of land, the only factor remaining to be considered, which cuts any important figure in the problem, is the cost of labor required in producing and marketing the fruit; transportation being estimated at present rates, or less, the possibilities favoring much lower rates.

CLIMATE.

First of all, is the climate of Southern California adapted to its production? Without hesitation we answer yes; but we must, with equal certainty, qualify the yes, for while the answer applies to *mesa*, or table lands in general in the southern portion of the State, it does not apply with equal force or truth to the river or creek-bottom lands, where there is more or less danger from frost; a slight elevation above the valleys, however, secures almost perfect immunity from permanent damage to trees or fruit.

That the tree and its fruit may be successfully grown in frosty valleys I will not deny, for I have seen it done; but there must be constant watchfulness, and considerable extra labor is required in protecting the trees until the branches extend above the frost line. Instances are not wanting, where young trees planted in river valleys have been killed outright, when the trunks have not been wrapped or otherwise protected; while those which were properly protected suffered only to the extent of loss of leaves and the smaller twigs, and ultimately came into full bearing, and are now yielding generously—so generously indeed, that at nine years from planting a two-year old tree, I have assisted in picking from it more than four thousand fruits in one year.

The location of a lemon orchard on valley land requires careful study. A sheltered nook behind a hill, where there is little or no breeze in the night time, is full of danger, for if frost puts his finger anywhere, it will be *there.* But the study of location is too often left for experiment, even by those whose experience should teach them better. One such trial I saw, where an experienced nurseryman planted more than a thousand Eureka lemon trees, and before two years had passed not a single tree remained to mock his foolishness.

In such localities, the topography of the surrounding country so controls climatic conditions, as to prohibit successful cultivation; but fortunately the area governed by such conditions is exceedingly limited, when compared with the aggregate area which is adapted to lemon culture.

Quite enough successful experiments have already been made to substantiate the claim, that there is ample acreage in Southern California, which, if utilized, would bar all foreign lemons from the markets west of Chicago. Nor need we stop at Chicago, for the superiority of our fruit will create a demand far east of that point.

LOCATION AND CONDITIONS.

In Italy the best results in lemon culture are secured near the seashore, so near that in many instances the trees are planted in the sands which have been washed up by the waves. They are, however, in such cases protected from cold sea breezes by hedges. From the seashore to an altitude of one thousand five hundred or two thousand feet is this industry successfully prosecuted, and in some instances to higher elevations.

In the island of Sicily the conditions are somewhat changed, and although the trees are planted close to the shore, as in Italy, yet the results are unsatisfactory, the trees being more liable to the attacks of pernicious insects, as well as of disease, the best orchards being at a considerable distance from the sea, planted in rich soil, with plenty of water for irrigation; and yet, where the best possible conditions are secured, a tree in full bearing is expected to yield only about six hundred fruits in a year.

In Venitia the lemon is cultivated with perfect success, in soil heavily charged with potash and lime, which makes it of a loose and friable character, and not inclined to bake or shrink, and into which the heat of the sun can easily penetrate.

In Turkey the lemon is planted in rich clay soils, the product being large, and the quality excellent.

The difficulties surrounding the cultivation of the lemon in the vicinity of Venice are greatly aggravated by liability to frost; and so great is this danger that in all orchards provision is made to ward it off by fires, built in and around them, when the temperature approaches the freezing point.

A majority of the lemon orchards in the Mediterranean country being more or less under the influence of moisture from the sea, makes them liable to all the diseases and accidents to which the limited area along the coast of Southern California is subject, while the vast interior country contiguous to it is governed by conditions equal, and without doubt superior, to the best section in the Mediterranean country.

Correspondence with a large number of American Consuls and commercial agents has convinced me that the lemon is successfully cultivated in countries possessing a wide range of soil and climate, and that it will adapt itself to widely varying conditions, in so far as valley, plain, mountain, and sea can affect the tree or its fruit; but as this discussion has relation particularly to Southern California, it is with its soil and climate we have to deal.

SOIL AND PLANTING.

My examinations and experiments lead me to this conclusion, viz.: A well drained soil, the surface of which is sandy loam, with underlying stratum of clay, will produce the most satisfactory results. My theory is this at the outset, recognizing the fact that irrigation must be employed, the object being to dissolve the substances in the earth, out of which the tree and its fruit is made, and which, without being so dissolved, are as valueless as though they were not in the soil, or, for that matter, did not exist; and it is equally important that these substances be retained in the soil, and within the distance penetrated by the roots of the tree, for the moment they sink to a greater depth they are lost; hence the interposition of a stratum of clay will effect the desired result, by preventing the rapid percolation and ultimate waste of valuable fertilizing materials.

I would discourage the planting of a lemon orchard on "adobe" soil, for the labor required in keeping it in good tilth is too great; but it *must* be so kept or it will shrink and crack, which not only strips the fibers from the roots, but allows the air to penetrate and dry out the surface or fruit-producing roots, a few days of neglect being sufficient to cause the ground to crack to a considerable depth.

The tree and its fruit are everything that could be desired, when planted in adobe soil, but the liability to neglect, and the comparatively large amount of labor required in cultivation, would deter me from planting largely in such soil. This has been taught me by experience on my home place.

I *would plant* in warm well drained soil, with an exposure which would give me the most sunshine; I *would not* plant on the north side of a steep hill. In planting I would adopt the quincunx method, with distance not greater than twenty-four nor less than twenty feet.

Many persons make a sad and oftentimes fatal mistake in planting lemon trees too deep. Nature has settled this matter by throwing out a system of roots at a certain distance below the surface of the ground, and however much deeper the tree is replanted, thus much is nature defeated in her intentions, and there must be a corresponding failure in results. My method of planting is this: a hole is dug large enough to permit every root to be spread out as it naturally grows, and two or three feet deep; set the tree no deeper than it was in the nursery, then with surface earth fill the hole, placing the roots in their natural position, always being careful to keep the ends of the roots as deep as possible; as the earth is thrown in tramp it *hard*, and *then* there will be a little settlement, which will carry the tree a little lower than it was in the nursery. As in the case of all other trees, when planted, the roots must be pruned, and all broken or bruised roots removed, and the top cut back to correspond with amount of root which has been lost.

The scope of this paper only contemplated the "*cultivation*" of the lemon tree, the supposition being that the planter had selected proper ground and location, and had planted the best varieties known in the market; but it would fall short of its *purpose* if no allusion were made to *planting* the tree.

PRUNING.

The lemon tree being a strong and vigorous plant, requires liberal irrigation, and above all, judicious pruning, for almost before a person is aware of it, long straggling branches will hinder cultivation, and must be cut back, thereby entailing an absolute waste and greatly lessening the vitality of the tree.

To prevent this waste and loss, the ends of the branches should be pinched off at the proper time, and with such discretion as will result in forming a symmetrical and well-balanced top; great care should also be taken in thinning out the small and weak branches, so as to afford circulation and allow sunshine to penetrate. Pinching off the ends of the limbs will cause them to throw out spurs, thereby bringing the fruit nearer the body of the tree. A failure to learn this lesson in time, and before I learned to "practice what I now preach," caused the ruin of a number of my oldest trees.

CULTIVATION.

The same general rules which apply to the cultivation of all other orchards, apply to the lemon. At the first fall of rain the cultivator should be used in such a way as shall stir the entire surface of the ground, and this process should follow every rain; this being well done, I do not insist on having the ground plowed; however, I believe that one plowing in each season is important.

In the Mediterranean country the orchard is kept perfectly free of weeds and grass, the best orchards being thoroughly pulverized at least five times each year. Certain it is that weeds and fruit do not succeed well together, even though a good crop of weeds be plowed under twice each year—a practice insisted on in a paper read before this society at the Los Angeles meeting. In my judgment, if there is any one thing more than another required in reaching satisfactory results in lemon culture, it is thorough and systematic cultivation.

FERTILIZING.

No reasonable man can expect an orchard to bring him a good crop of good fruit, except he shall furnish the materials from which to make such fruit.

Every crop of fruit, and every branch and leaf of the tree producing it, takes away from the soil certain materials. This process cannot long continue without serious exhaustion, and it is plain that these substances must be returned to the soil—nor should we wait until the trees tell us "we are hungry," but, reasoning from general principles, we should apply the proper fertilizers in season, and if the stable does not furnish sufficient amount, resort must be had to commercial fertilizers, to be found in all markets.

To "dress and keep the land" is an injunction placed upon the oldest horticulturist from whose history we can quote, and the man who does not obey this injunction, placed by the highest authority to which appeal can be made, will ultimately chronicle a failure.

A comparative analysis of conditions having demonstrated the fact that we can grow lemons, the next question is, how to reach the most satisfactory results.

VARIETIES.

Many trees have been started from seeds, but, as a rule, have proved worthless, the fruit being large, coarse, and as varied in shape and appearance as apples which are grown on seedling trees. The trees are studied with vicious thorns, the fruit crowded with seeds, the fiber of the pulp exceedingly tough, the rind rough, thick, and more or less bitter, and necessarily deficient in juice. These objections are sufficient to deter any one, embarking in lemon culture for profit, from planting an orchard with trees grown from the seed.

These objections are, however, largely modified by time; the fruit decreases in size, the shape becomes more uniform, the fiber of the pulp firm and less tough, the rind more smooth, reasonably thin, and less bitter, and the juice increases in quantity; yet too many objections remain to permit the planting of seed, except for experiment.

From the vast number of seedling trees which have been brought into bearing, only half a dozen or less have gained notoriety for superior excellence, the best among them being the Eureka, which was produced by Mr. C. R. Workman, of Los Angeles, and which was first brought to notice by Thomas A. Garey in 1877-8. Perhaps the greatest excellence *in quality* is found in the "Lisbon," a variety said to have been imported from Australia. However this may have been, there can be no question in regard to its value as a *lemon*, but it is wanting in some essential characteristics, uniformity in size and shape, and liability to damage by handling.

The hardiest tree, producing the largest quantity of fruit, at the earliest age (of which I have any knowledge), was grown from the seed of a lemon sent to me from New Orleans by Senator J. S. Harris. Buds from this tree have produced most excellent results. Specimens of fruit grown from buds set in lime roots are now exhibited for examination, and the Horticultural Commission, through its Committee on Nomenclature, will be asked to give it a name.

I have never tasted a sweeter rind, nor have I seen finer or more delicate pulp, less seed, or more juice in any other lemon. The tree develops very few and short spines, a punctured lemon being a rare occurrence. From one tree in my yard I picked one thousand and sixty lemons before the bud had been set three years, and this season I have picked more than eight boxes of fruit from the same tree (eight years old).

The public demands the lemon it has become accustomed to, or one similar to it, and the "Eureka," or the lemon above referred to, more nearly answers the purpose than any others.

Many of our lemons require bleaching to bring them to the color of the imported fruit; but this can only be done where fruit is packed by experienced hands.

GATHERING THE FRUIT.

In the Mediterranean country, the lemon is cut—not pulled—from the tree, at any period in its growth, without regard to ripeness, *size* being the only requisite. This fact explains the reason why so many of the imported lemons are bitter, and also why so many of them are deficient in juice. Nature has not been permitted to complete her perfect work.

After being picked the fruit is allowed to lay until the sweating process has carried off sufficient moisture to permit them to be wrapped and packed for shipment, which is done to a very limited extent by the producers, they having learned that which we must, sooner or later, learn, viz.: that to successfully pack fruit it must be done by experienced hands; and when every community has its own sweat-house, where all the fruit can be properly treated and uniformly packed, *then* will our fruit have a market. That the fruit should not be picked when entirely green cannot admit of a doubt, and no evidence of this fact is more conclusive than the absence of juice in a lemon which has been picked in that condition, when compared with a lemon picked from the same tree, but in a more advanced stage of growth.

PACKING.

In Southern California too little attention has been paid to the proper grading of the lemon, and in this fact lies one of the reasons why the cultivation of this fruit for "profit" has proved unsatisfactory. They must be of uniform size; they must be packed in uniform layers; they must be wrapped, and the grower or packer must put his name on the wrapper as a guaranty for their quality; for if the grower nor packer will guarantee their quality, how can the dealer? Take two boxes of lemons, one of them thus packed, and the other with fruit of all sizes thrown in, without wrappers, and is there any one who will doubt which grower will be best satisfied with his returns?

I have tried a great many experiments in keeping lemons, and my best success has been secured in this way: Cut the stems about a quarter of an inch long and lay the fruit carefully in small baskets, and from the baskets pack them in boxes of any convenient size, but not more than a foot deep; or they may be packed in bins or on a floor, when they may be covered with blankets, sacks, or canvas. Let them remain covered from three to four or even six days, when they will be found perfectly wet; this will so soften the rind that it will be flexible and can be handled with safety. The coverings may now be removed so that a current of air will soon dry them, when they may be wrapped and packed, and should be placed where the temperature is as near uniform as possible and entirely protected from air drafts. By this method I have had no difficulty in keeping lemons four or five months. When sent to market an inspection of the boxes must be made. If there be indications of decay they must be repacked, but if no shrinkage is observed it is a sure indication that they are sound.

In regard to cold storage, I have neither experience nor information sufficient to advance an opinion; my impressions are, however, that I would not experiment on a large scale at first.

PERNICIOUS PESTS.

The only pests which I have encountered are the black and red scale and the red spider, the red scale being the most difficult to eradicate, and next to it the red spider.

I have found the formula for insecticide made use of by Mr. Lelong, and published in "Biennial Report of State Board of Horticulture," 1885–86, page 377, to be very effective when thoroughly applied.

Whale-oil soap, in proportions of one quarter to one pound dissolved in one gallon of water—the quantity depending on condition of tree to be treated as well as upon age of insect to be destroyed. Thoroughness of application will give good results with nearly all the washes which have been introduced; the two mentioned I believe to have been most satisfactory.

Immediately on the coast the scale and spider are most troublesome in consequence of the lower temperature and greater humidity of the atmosphere. Too careful watch cannot be kept, and the moment a scale bug or spider is seen, he should be destroyed, as the time consumed in preventing the spread of these pests will be far less than will be taken to destroy them.

Facts and opinions relating to the cultivation of the lemon in various parts of the world might be quoted, but far more valuable are facts and opinions derived from experiences in our own section; therefore, it is proper that I quote from the report of L. M. Holt, Esq., of the "Press and Horticulturist," made after an exhaustive examination in San Diego County of all the conditions embraced in the cultivation of the lemon in that section, believing as I do, that no man in California is more competent to judge of these matters than is Mr. Holt. I quote as follows: "Horticulturists in Los Angeles and San Bernardino Counties all agree that the lemon must be grown on orange stock. Seedling lemon orchards have been abandoned because of inferiority of the fruit, liability of the tree to 'gum' disease, and a stunted growth. This position is now universally accepted as sound." Again he says: "In Mr. H. M. Higgins' seedling lemon orchard, situated about four miles east of National City, on National Ranch, there is not to-day a diseased tree, or a tree that shows an unhealthy growth; the trees are all vigorous."

In regard to the character of the fruit, Mr. Holt says: "The rind of lemons generally, throughout San Diego County, is smooth, glossy, and thin. After visiting this orchard we carefully noted the condition of the lemon tree wherever we went, and failed to find anywhere a diseased tree, or a vacancy in a seedling orchard, with one exception." Further on Mr. Holt says: "We note this as a horticultural fact, and desire to give San Diego County the credit of having a climate better adapted to the growth of the lemon than that possessed by any locality north of that county."

The results of Mr. Holt's examination into the conditions required for successful lemon culture have been verified by all who have given the subject consideration.

In conclusion, permit me to say, I believe no country on earth possesses advantages superior to Southern California, for producing the lemon, and for many reasons—among them the fact that our trees begin to fruit when very young, thereby enabling the poor man to get returns at a time when his success depends upon it. Our trees produce two or three times as much fruit as do trees of same age in the Mediterranean country, thereby compensating for difference in cost of labor employed in their production; and it is beyond question that when a tree in that country brings six hundred fruits, one of the same age in Southern California may fairly be expected to produce one thousand eight hundred.

We have nothing like the climatic difficulties which are encountered by other lemon-producing countries; we can keep our fruit on the trees till it is more fully developed, thereby saving an immense loss in bulk while undergoing sweating process, and at the same time secure a larger amount of juice from the same weight of fruit.

Yet the one all-controlling fact stares us in the face—our fruit goes upon the market in a totally unmerchantable condition. This is best illustrated by an example. Last Saturday I interviewed the fruit dealers of San Diego, and found Sicily lemons selling at $9 per box, and domestic lemons at $1 to $2 per box, and on inquiring the reason for the difference in price, I received this answer from all of them, viz.: "The Sicily lemon is *good*, the California lemon is *good*—for nothing." And the statement was pretty near the truth, because the former had been properly sweated, properly selected, of uniform size and shape, and were systematically wrapped and packed; while the latter had not been sweated, were as hard as rocks, were of all sizes, from a walnut to a citron, many of them covered with scale and smut, not wrapped, and were thrown into the boxes in the most promiscuous manner. Such fruit does not deserve a market. A few men do properly sweat, wrap, and pack their fruit, and when put in market get $3 to $4 per box for it.

It is said that when the retailer gets such fruit he is liable to transfer it to imported boxes, and when so transferred I have yet to find the *expert* who would not declare them to be the choicest Sicily lemons; in fact, a box of such lemons will weigh from five to ten pounds more than the same sized box of Sicily fruit, which means that much more weight of juice.

I would strongly recommend every locality to have a general packing-house, from which to turn out goods of uniform character. When this is done the lemon will do what the raisin has done, viz.: drive the foreign product from the market.

Mr. Killom: I wish to make one remark as to the suggestion of Mr. Kimball on the lemon. The lemon, as has been stated by him, throws out long shoots and makes a straggling tree—is a very difficult tree to manage and cultivate around. Now, if I had done as he stated in his lecture, when I put out my young lemon trees, and pinched back the foliage, and done it carefully, and had a symmetrical tree, I would have my fruit banked near the center of the tree, and I would have been prevented from losing one or two years' crops, because, after my lemons commenced bearing, to put my trees in shape I went all around and cut them back, and hence, lost my fruit for one year and partially the next year.

MR. SALLE: I rise to champion lemon culture in Southern California. There are many modes of handling the fruit; there is nothing as an article of commerce that will exceed the lemon, and my experience is that the Eureka is far the best lemon for that purpose; it is seedless, and can be used when perfectly green, from the size of your thumb up to the full grown lemon. If the winds come and blow the fruit off the trees, all you have got to do is to chop them up and make marmalade. It does not get bitter; the sweet rind lemon makes bitter marmalade; but there is no need of one single lemon going to waste of the Eureka variety. Send it to the East when fruit is scarce and there is nothing that will serve so well as lemon marmalade; every family, when they become used to it, will use it largely, and take it all in all, it will go into every market in the United States, and probably be exported.

The Convention here adjourned until the following morning at nine o'clock.

FOURTH DAY'S PROCEEDINGS.

SANTA BARBARA, April 12, 1888.

ORNAMENTAL PLANTS AND SHRUBS.

Essay by **HENRY CHAPMAN FORD**, Santa Barbara.

Between the thirtieth and forty-second degrees of north latitude, and between the one hundred and fourth and one hundred and twenty-fourth degrees of west longitude, lies the great commonwealth of California. With a more extensive area than any other State of the Union, if we except Texas, a longer shore line, greater topographical diversity, more inspiring grandeur of scenery, variations of soil and satisfactory climatic conditions, need we marvel at the enthusiastic devotion to this favored region that is universally manifested by those who can claim a home in any of its delightful valleys, nor at the widespread interest at present developed throughout the older States and Europe regarding our prosperity. A mean temperature that favors alike the growth of the pine and palm, the apple and the orange, the grape and the fig, the banana and the strawberry, together with the rose and the camellia, the lily and the lotus, ought to prove peculiarly congenial to such of the human race as are fortunate to breathe its equable atmosphere.

A California garden necessarily differs from all others within the limits of our wide land, and the infinite blending of hardy and tender species of plants and shrubs, selected from all zones and longitudes, challenges a parallel in the whole world. The botanic wealth of every clime, unless we except the lowland flora of the extra tropics, is our inexhaustible storehouse.

With these boundless resources, the problem, What shall we plant? becomes a difficult one to solve.

Thus far, with all our horticultural experience in California, we have not reached the limit of experimentation; nor shall we, as long as new species are offered, and intelligent and enthusiastic planters exist. The most carefully selected list of desirable plants and shrubs would not be suitable to *all* the varied conditions of our extended domain, so much depends upon situation, soil, temperature, and atmospheric saturation. Then again, the available area for ornamental planting places limits on our enumeration for general uses. The cramped city lot requires a more studied selection than the ample grounds of a suburban home. We cannot all have comprehensive botanical gardens, nor should such an extensive collection be desired, unless one aims at experimental and scientific study. In any case, crowding should be avoided, and where groups of shrubs or plants are placed, due care should be had that form and color contrast or harmonize without offending a cultivated taste.

Lest we trespass upon the subject of landscape gardening, we will proceed to point out, to the best of our humble judgment, such species of plants and shrubs as may be considered both desirable and available for general planting within the limits of the State.

I shall speak of the introductions already tested at various points, followed by a list of those new species that promise to be desirable acquisitions, adding such indigenous California species as seem worthy of a place in every collection, taking up each class by itself.

It is hardly necessary to urge the planting of the familiar biennials and perennials of our eastern or European gardens. Certainly, for the sake of old memories, they should not be ignored. Since our childhood days many of these old friends have been enlarged and improved in color, almost beyond recognition. The *Calendulas*, *Carnations*, *Antirrhimums*, *Hollyhocks*, *Perennial Phlox*, *Perpetual Stocks*, *Nasturtiums*, *Wallflowers*, *Verbenas*, *Perennial Poppies*, *Penstemons*, *Delphiniums*, and *Columbines*, among the herbaceous plants, take kindly to our conditions and produce perfect blooms. Since the introduction of the Japanese and Chinese varieties of the *Chrysanthemum*, our gardens may be glorious with color in autumn. They should have special treatment to prevent their blooming out of season in this climate. It has justly become a fashionable flower, and is receiving great attention in England and France, and, of late, our eastern florists have taken advantage of its popularity, and have increased the size of the flowers beyond any limit ever expected. One florist alone has over seven hundred varieties. A greater range of color has been attained in the *Chrysanthemum* than in almost any flower cultivated. Especial exhibitions of the flower are held in Europe and the East, and the example should be imitated in California.

Among the most beautiful of herbaceous plants is the white Japan *Anemone*, the *Spirea Japonica*, *Salvia Splendens* and *S. Patens*, *Justicia*, *Mahernia*, the *Stevias*, and *Cinerarias*, nearly all of which are classed as greenhouse plants, yet need no protection here.

The *Geranium* in California makes quite another showing, compared with the plant of eastern gardens. Its rampant growth prevents planting on limited grounds, except the specimen be rare in flower and foliage. Trained to fences and walls, it may serve in place of hedges. The *Pelargoniums* are at home here; in fact, all the South African plants and shrubs do well in our climate, and those of the Lady Washington type should, for their great variety of lovely color, be found in all gardens. A single *Pelargonium* in Carpenteria has, from its abnormal size, acquired a national reputation, being one hundred and forty feet in circumference. This class of plants loves sunshine, a rather cool temperature, and will do their best without much water during the dry season.

Fuchsias, in the more moist locations, become monstrous. In one Santa Barbara garden is a specimen twelve feet in height. The plant needs partial shade, rich soil, and plenty of water.

With the new strain of large flowered *Verbenas*, splendid masses of color can be obtained.

Many of our California wild flowers have been domesticated, and now add to the glory of eastern and foreign gardens. Among them the *Eschscholtzia*, *Nemophila*, *Collinsia*, *Godetia*, and several specimens of *Oenotheras*, *Lupines*, *Gillias*, and *Phacelias*. These and many others should not be ignored in our own planting.

BULBS.

The *Gladioli* have been improved in size of blooms and infinity of combinations in color.

The Mexican *Tigridias* do well in California.

The various *Amaryllis* multiply abundantly and bloom profusely with little care.

Hyacinths can remain in the ground from year to year without lifting as in the East, and will yield well formed, full spikes of flowers, if the winter rains are abundant.

Tulips do not thrive in the drier portions of the State, under the present mode of treatment.

A large variety of the *Narcissus* have been produced by the foreign florists, and these beautiful flowers seem to be at their best wherever introduced on this coast.

Most species of lilies take kindly to the prevailing conditions, but they will not thrive where it is hot and dry. The beautiful lilies of Japan are all perfectly hardy here, and will grow in almost any common garden soil, mixed with well rotted manure, together with leaf mold and peat where they can be obtained. *Lillium auratum*, and its varieties, is termed the Queen of Lilies. It is the common wild lily of Japan, where the stems rise from three to twelve feet in height, with flowers from three to one hundred and seventy-five on a single stem. No flowers, unless it be *Olea fragrans*, have so strong a perfume.

The *Ixias* and *Sparaxis* are among the most graceful and beautiful of the bulbs, somewhat similar in growth, and requiring the same culture. They should be planted in large beds, and when the flowers, with their rich and varied coloring, open in the sunlight, a picture of gorgeous beauty is presented. These and all other Cape bulbs thrive here.

Anemones and *Ranunculus*, which require protection in the Northern States, are hardy in California, but do not reach the same perfection as in Europe.

The numerous varieties of *Iris Iberica*, *Germanica*, and *Kæmferii* should find a corner in all gardens. The latter has distinct and showy colors, rivaling the orchids, and remains in flower for a period of from five to seven weeks. The old favorite, the tuberose, should not be forgotten in the collection, a few bulbs, with proper irrigation, giving great satisfaction.

The *Cyclamens* produce fine blooms in the outdoor atmosphere of California, and the same may be said of the *Tritonias*, *Watsonias*, and *Babianas*.

Single *Dahlias* have won favor of late with their elegant forms, striking colors, and abundant flowers. As cut flowers they are valuable.

The *Calla* is unanimously planted, and deservedly so, for nowhere else is it so profuse in blooming. From a single Santa Barbara garden one thousand three hundred flowers were cut for the Easter decoration of one church.

The *Fresia*, a beautiful white free blooming Cape bulb, which is in flower from Christmas until June, is a late introduction. When cut and placed in water the flowers continue open for several weeks.

The improved *Tritonias*, with their mammoth spikes of scarlet blooms, are very striking.

Many of our indigenous California bulbs are equal, if not superior, to foreign introductions, and these, where possible, should have a place; especially the *Lilies*, *Fritillarias*, *Brodiaes*, and *Calochortus*.

The tuberous rooted *Begonias* have proven quite hardy, growing unprotected at Santa Barbara, and flowering very profusely.

The *Strelitzia*, a costly greenhouse plant with a striking flower, with common garden treatment thrives and multiplies.

Many of the *Crinums* are beautiful, and delightfully fragrant. Some have been introduced; other species should be.

The *Doryanthes palmeri*, or Queensland lily, is found in many of our gardens. Where well irrigated it throws up a flower stalk to the height of eight or ten feet. It flowered for the first time in Dr. Dimmick's grounds last season, but was somewhat disappointing after glowing descriptions of florists.

The *Eurycles cunninghami*, or Brisbane lily, a bulbous white flowered plant, also from Australia, is quite ornamental.

The ginger, whose fleshy root has commercial value, makes a stately plant with plenty of water, and its large spikes of yellow flowers are very fragrant.

From plants of marked beauty in form, and variegation of foliage, we would choose the following: The *Centaureas*, for their peculiar dusty-miller color; *Alocasias* and *Caladiums*, where water is available; the *Acanthus*, the leaves of which suggested the capital of the Corinthian column; the garden French artichoke, for foliage flower and decorative seed heads; and the *Camas*, some later introductions of which have large, beautiful colored flowers and banana-like foliage, having a tropical effect where properly grouped.

Among the desirable *Aralias*, the "rice paper plant" of China is becoming common in our gardens. The variegated and plain *Coprosmas*, having thick glossy foliage; the *Arundo donax*, a mammoth variegated grass, having canes similar to a bamboo; the *Dracænas*, including the dragon-tree (*D. draco*) and the Australian *Cordylines*, with some of the colored leaved species; the New Zealand flaxes (*Phormium tenax* and *P. colensoi*) and their variegations; the Japan *Elægnus* with its golden leaves; the variegated leaved *Abutilons;* the spotted and picture foliaged *Farfugiums;* the grand *Musu ensete*, with its spreading banner-like leaves, presenting a tropical aspect superior to all plants thus far introduced, together with other bananas. Many of the foreign and native *Yuccas;* the Mexican and Peruvian *Bonaparteas*, having a singular graceful appearance; nearly the whole family of *Agaves*, most of which, either in or out of the flowering season, are extremely desirable for contrasting effects; the *Aloes*, especially *Glauca* and *Socotrina;* the *Bambusas*, some of which should be in every plantation, not only for their extremely graceful appearance, but for their varied utility; the *Brugmansia*, from Peru, with a profusion of pendant and strongly perfumed, trumpet-shaped, white flowers, although common, is exceedingly attractive; the Mexican *Beaucarnea*, throwing up a tall flower stalk having numerous beautiful blooms; the *Poinsettia* with its gorgeous scarlet bracts; the West Indian and Japan *Bocconias*, having pretty glaucus-green foliage; the *Nandina domestica*, or "sacred bamboo," with clusters of bright-colored berries, that is planted around the Buddhist temples of China; the elegant and ornamental *Poincianias* of Madagascar and India; and the hardy palms, *Palmettos* and *Cycads*, the following having been tested in Southern California: *Seaforthia elegans*, *Chamærops cexcelsa*, *C. fortune* and *C. humilis*, *Livistona australis*, *Cocos plumosa*, *Sabal adansonii*, *Corypha australis*, *Phœnix dactylifera*, *P. reclineta*, *P. sylzestis*, and *P. rupicola*, *Areca rubra*, and *A. sapida*, *Rhapis humilis*, *Cycas revoluta*, *Caryota uren*, *Kentia baueri*, and *K. sapida*, and our Pacific species *Washingtonia filifera*, and *Erythea edulis* and *E. armata*, these latter being exceedingly desirable for their rapid growth and hardiness. All the palms are highly ornamental, and, where thriving, no other plants could bear equal testimony to the semi-tropic character of the region. The noble tree ferns of Australia bear open air treatment and may be seen in several of our Santa Barbara gardens.

CLIMBERS.

Within a few years the *Clematis* has risen in favor as a garden flower, and certainly, from the various types, including *Patens*, *Florida*, *Languinosa*, *Viticella*, and *Jackmani*, a charming range of color and dimension of flowers, double or single, can be selected. Either trained to walls or left to wantonly creep over rock work, the results are exceedingly pleasing.

The delicate climbing *Asparagus* is new and desirable.

The *Bougainvilleas*, with pink or magenta flower bracts, make a showy spectacle. They are quite hardy in most situations, at or near Santa Barbara, and also other points in the State.

All the greenhouse *Tecomas* are at home here, and some species make extraordinary growth, and are almost constantly in flower. The same may be said of the *Tasconias*, the scarlet variety covering large spaces each season. Five or six species of the *Bignonias* are introduced. *B. venusta*, with its long sprays of orange blossom, brightens our gardens during the three winter months. The *Passifloras* all do equally well, and among them are some exceedingly desirable ones, notably the *Ark-en-ciel*, *Alba*, *Schmittii*, and *Alata*.

The *Mandevillea*, from the Argentine Republic, has lovely white flowers, and should be in every garden. The *Stephanotis*, in sheltered portions, should be planted for its exquisitely scented flowers. The white and rose-colored *Sapagerias* ought to succeed where the thermometer does not go below freezing point. The fragrant *Rhyncospernum* is a desirable winter bloomer. The *Campsidium*, a free growing climber from the Fiji Islands, with delicate fern-like foliage, and the *Maurandya*, are each pretty. *Antignonon*, or the "Rosa de Montaña," of Mexico, should also find a place, as well as the *Aristolochies*, with their singular flowers. Some of the *Thunbergias* are delicate and beautiful climbers. Of the summer and more hardy climbers, one can choose from the following—all good: *Ipoma Noctophyton*, *Lophos pernum*, *Akebia*, the several species of *Ampelopsis*, *Jasmines*, *Solanums*, and *Myrsiphyllum*, or so called smilax. To cover large spaces in a short period of time I know of no climber that has been tried on this coast equal to *Pilogyne suavis*, whose numerous flowers also furnish excellent bee food.

The *Kennedyas*, a beautiful genius of Australian climbers.

The *Actinidia* is attractive, with its thick, oval, shining leaves, clusters of large, white flowers, and showy bunches of crabapple shaped fruits. It is a new introduction from Japan. The Chinese *Wisterias* are also favorites. The English ivy makes good growth in the maritime districts of California, covering walls quite rapidly, and the same may be said of the Japan *Loniceras.*

The *Sollya*, *Clianthus puniceum*, *Hardenbergia*, *Plumbago*, and some of the *Jasminums*, seem to lose their climbing habit in California and become shrubs.

Of the climbers not yet tested on the coast to any extent, I would recommend the introduction of the following, viz.:

Cissus antartica, from New South Wales, and *C. capensis*, from South Africa. I have never seen the *Quisqualis villosa* outside of one Santa Barbara garden. It is a novel, yellow-flowered climber from Burmah, that should have a wide planting.

The *Brachysema latifolia*, a very handsome climber from Australia, should be tried.

Travelers in Japan speak of being perfectly bewildered by the beauty of the climbing *Hydrangeas.* I am not aware of their general introduction.

The *Calampelis scabra*, an orange-flowered pillar creeper from Chili, would thrive here, and the same may be said of the *Fagelia*, a very desirable climber from South Africa. The *Periploca*, of which there are several species from Syria, Canaries, and other countries, is a valuable plant for covering naked walls, etc.

The *Lophospernum erubescens*, a very elegant climber of Mexico, with beautiful pendant rose-colored flowers.

The *Lardizabala biternala*, of Chili, is a hardy, rapid growing, evergreen climber, suitable for covering high walls and trellises. It bears an edible, pleasant flavored fruit, much esteemed by Chilians.

The *Cologania angusttifolia*, a beautiful evergreen climber, from Mexico, with lively purple flowers, and *Thladiantha dubia*, a yellow-flowered scandent of China.

AQUATICS.

Where running streams pass through a garden, or where an abundance of water can be obtained from artesian wells, it becomes easy to construct ponds and tanks for the growing of aquatic plants—an exceedingly beautiful and interesting class. Even a fountain basin, with a few such plants, can be made the source of much enjoyment. E. D. Sturtevant, of Bordentown, New Jersey, who has made a specialty of the propagation and growing of aquatics, is about to transfer his interests to the Los Angeles region, and, in the near future, it will not be difficult to obtain the most desirable of these plants. Mr. Sturtevant thinks the *Victoria regia* will bear out of door treatment throughout all the warmer regions of the State. It is the giant water lily of the Amazon, the grandest of all aquatics, producing leaves six feet across; one plant covering a space thirty feet in diameter, the flowers being from twelve to sixteen inches across. Of the most attractive of the class we have the *Nympeas*, *Limnacharis*, *Sagittaria*, *Pontederia*, *Ouvariandra*, *Limnanthemum*, and the *Nelumbium speciosum*, the "sacred lotus" of the Nile, having a rose-colored flower which is delightfully fragrant. Of other *Nelumbiums*, our native species, with sulphur-yellow flowers, and three others from Japan, are desirable. The Egyptian paper plant, *Cyperus papyiferum*, and other species of the family should have a place with the above.

The *Papyrus* has already been successfully grown in California, where there is plenty of water. The *Arundos*, called *Eulalias* and *Bambusas*, can also be used in moist places. There are a host of other water-loving plants that might be mentioned if space permitted.

SHRUBS.

In the selection of shrubs that are sure to find favorable conditions in California gardens, we have access to such a bewildering list that we are at a serious loss what to indorse and recommend for planting. Those already introduced are but a tithe of the vast catalogue that could be taken from the four quarters of the globe; we could still levy contributions from the regions already represented until our borders would not contain the beautiful species obtainable. The following countries yield up their treasures to enrich and beautify our California heritage, viz: The table lands of Mexico and Central America, Ecuador, Peru, Bolivia, Chili, and the Argentine Republic of South America; the entire European region, Northern and Southern Africa, and nearly all of Asia, including Palestine, the cooler portions of India, and the whole extent of China, Corea, and Japan, Australia, New Zealand, and some of the islands of both the Atlantic and Pacific; add to these selections from the whole North American flora, can we not, indeed, have a wide representation?

Of those species that are denominated evergreen, or those that have persistent foliage the entire year, the following have already been domiciled:

Abelia triflora, from Hindoostan, a handsome shrub with clusters of pale pink, delicately fragrant flowers. Other abelias have also been planted.

Busaria spinosa, from New South Wales, and very showy when covered with a profusion of pretty little white flowers.

The *Banksias*, *Australis*, and *Coccinea*, belonging to the *Proteacea* of Australia, are novel and interesting.

Clianthus puniceous, or "parrot-beak shrub," is an elegant addition, but is liable to be infested with scale insects.

Aster argophyllus, from Tasmania, sometimes called "true aster," is an ornamental shrub, with leaves having the fragrance of musk.

Correa alba, and other species of the same family, with white and scarlet flowers, all from Australia.

Cestrum auranticum, from Guatemala, orange flowered.

Daphne odorata, of China, a dwarf shrub with flowers of exquisite fragrance, blooming in winter.

Diosma alba, a small shrub from South Africa, with delicate heath-like foliage, having exquisite fragrance, which has suggested the name "breath of heaven."

The *Eugenias*, *Australis*, and *Myrtifolia* are large shrubs from Australia, with bright, glossy foliage, white flowers, and purple berries.

Myrtus communis, a favorite fragrant-leaved shrub, from Southern Europe.

Duranta plumeri, a blue-flowered evergreen, from South America.

Eranthemum tuberculatum, a small East Indian shrub, having an abundance of white flowers.

Templetonia glauca, from Australia, a dwarf, red-flowered shrub.

Escallonia rubra, a fine shrub, with red, tubular flowers, from Chili. It is of easy culture, and makes a showy appearance on the lawn.

Gardenia fortunei, the favorite Cape Jasmine, first introduced into England from China, by Fortune.

Malope alba, from North Africa, a small shrub with branching habit and large white flowers.

Guevillea concinna, a beautiful-flowered shrubby species of an interesting class of Australian proteads.

The *Laurestinus*, a species of *Viburnum*, from the south of Europe, is a desirable shrub, if kept free from the scale.

Polygalas, from South Africa, almost constantly covered with purple leguminous flowers.

Fabiana imbricata, a heath-like shrub, from Chili.

The *Swainsonias*, with rose, pink, and white blooms, have proved very satisfactory, being free in flowering. They were introduced from Australia.

Psorelea pinuate, from South Africa, a fine shrub with pine-like foliage and blue flowers.

Of the large family of *Veronicas* the *V. imperialis* seems to be the most satisfactory introduction.

Of the *Pittosporems*, from New Zealand, Australia, and Japan, we have several species, all exceedingly desirable in foliage and fragrant flowers, and some having showy clusters of orange berries.

We have two species of the *Habrothamnus*, from Mexico, both satisfactory.

Rapholepsis ovata, a native of China, has fine spikes of white flowers, with dark purple berries.

The *Plumbagos*, from South Africa, should be in every collection, as they are constant bloomers.

Leptospernum scoparium, of Australia, has myrtle-like leaves, that are sometimes used there for tea.

Genista canariensis, or Canary Island broom, is one of the most showy yellow-flowered shrubs introduced into California. The perfume is exquisite.

The *Myoporum vitelinum*, an Australian shrub, with transparent spots in the leaves, is found in many of our gardens.

The *Andromedas* and *Kalmias*, of the eastern portion of our country, have been sparingly planted; yet they deserve more attention.

Many species of *Hibiscus* have found a place in our gardens; but others equally showy should be planted.

The *Bouvardias* have proved very satisfactory, if planted in partial shade, with plenty of water.

Kerria japonica proves satisfactory everywhere.

The *Neriums* (oleanders) seem to be at home throughout California, but do best in the foothill regions of the Sierras. In the south they are infested with scale.

The *Makaya bella* is a lovely introduction from Natal, with trumpet shaped lilac-purple flowers. It requires considerable irrigation in this region to get perfect blooms.

The Japan *Acubas* may do well in some situations in Northern California, but they do not thrive in the south.

The *Berberis*, *Buxus*, *Genista*, *Calycanthus*, *Enonymus*, *Ilex*, and *Pyracantha* all flourish as in their native land.

The Japan *Skimmias* ought to do well, it would seem, but thus far they are not successful, in this region at least.

The Cape of Good Hope *Heaths* are mostly at home here.

The *Indigoferas*, of Australia, thrive satisfactorily.

Of the Australian *Hakeas*, a half dozen of the most showy species of these very interesting shrubs have been introduced, and others should be sought. Many have novel foliage.

The shrubby *Stercultis*, from the same region, have proved desirable.

Among the coniferous shrubs, we have some of the *Retinisporas* of Japan, and, where well grown, nothing can be more satisfactory.

Several species of the *Metrosideros*, of New Zealand and Australia, have been introduced, that are well worthy a place in every garden.

The *Buddlia lindleyana*, of China, flourishes here, and other species of the family, having yellow, crimson, orange, and white flowers, ought to be introduced from South America and Australia.

The elegant "silver tree" of South Africa, *Leucadendron argenteum*, which is now growing in several Santa Barbara gardens, was first introduced by California amateur florists. Other species of the Cape are nearly as desirable.

Ilex haraguaensis, or South American tea, is a shrub of elegant character, but thus far sparingly planted.

The Chinese azaleas in their endless variety are beautiful and desirable. Of *Azalea indica*, one hundred and seventy-five varieties, and half the number of the Belgian hybrids, can be found in the catalogue of a Flushing, N. Y., nurseryman. In soil containing peaty or other vegetable matter, well drained and in partial shade, with considerable water, these charming shrubs ought to give the greatest satisfaction in our California gardens. Perhaps the *Rhododendrons* are more difficult to manage, requiring coolness and moisture, but in many situations in our State they will no doubt thrive. The *Camellia* should find a place in all our gardens. Plant large, well grown specimens, in partial shade. A shrub of the red variety in Montecito yields thousands of blossoms annually. As in China, the *Camellias* ought to become a tree in California.

The *Chorozema*, which is rare in greenhouses, becomes an open-air shrub here. As it is a winter bloomer, its rich orange pea-shaped flowers brighten the grounds where other shrubs are at rest.

The tea shrub, *Thea bohea*, is ornamental, having bright shining foliage and white flowers. A fine specimen is to be found in a Montecito garden.

SHRUBS THAT OUGHT TO BE INTRODUCED.

Among the desirable evergreen shrubs that, so far as my observation extends, have not yet been introduced to the coast, are the following:

While there is, perhaps justly, an outcry against planting the tall-growing *Eucalypts* of Australia in grounds of limited extent, there should be less objection to the dwarf species of the family, over twenty of which are available, many of which are distinguished for their beauty of form, foliage, and flowers.

A few of the shrubby *Acacias* are to be seen on the coast, but a large number of charming species are yet to be selected to beautify our gardens, if some means is devised for the eradication of the "fluted scale," which finds its most congenial home upon this genus of trees and shrubs.

The *Boronias*, of Australia, are a remarkable free flowering family of shrubs, and would succeed here.

The *Illicums* of Japan and Florida, *Chionanthus fragans*, or Japan allspice, *Cleyera japonica*, *Eury japonica*, *Dendroponax*, *Japonica variagata*, *Ligustrum japonicum*, *Daphsiphyllum glaucescens*, all of Japan.

Olearis haastii of Australia, the *Photonias* of Japan, the *Persoonias* of the same region.

Azalea amorena, a Chinese dwarf shrub, the foliage of which turns to a rich brown in the winter.

The Chilian *Azaras*, Chinese *Clerodendrons*, etc.

CALIFORNIA SHRUBS.

While seeking for novelties for the embellishment of our grounds, we should remember we have many shrubs, deciduous and evergreen, growing in the cañons and on the hills and mountain sides of our own State, that are as worthy of attention as any exotic, some of which had never impressed us with their beauty until they had been sought out by foreign florists, and after being propagated abroad have been sent to us as novel introductions.

Let me enumerate some of them most worthy of a position about our homes:

Carpenteria californica. It has hundreds of large snowy blooms, which make a magnificent showing against a background of deep green laurel-shaped leaves.

Berberis fremontii, a large shrub. When flowering it is laden with golden blossoms. Its sap furnishes a powerful yellow dye.

Rhododendron occidentale. This charming California azalea has large, fragrant, white blossoms.

Styrax californica has already been transplanted in some Santa Barbara gardens, where it finds ardent admirers.

Prunus ilicifolia has very ornamental shining foliage, and attractive colored fruit.

Dendromocon flexile, a beautiful shrub with large bright lemon-yellow flowers, has recently been discovered on Santa Cruz Island. Another species, *D. regidum,* is better known. Both are very desirable.

Lavatera assurgentiflora, the handsome tree mallow, that is found in the gardens of our Spanish inhabitants.

Malvastrum splendidum is a malvaceous shrub, with gray-green leaves and pink flowers, borne in a graceful spike at the end of the branches.

Of the twenty-one species of *Ceanothus* in the State many would be very ornamental in our gardens.

The *Romnya californica* is certainly one of the most attractive shrubs in the whole range of our planting, its immense poppy-like flowers, nearly six inches in diameter, with glucus-green foliage, being a delight to all.

Heteromeles arbutifola, the "toyon," or California holly, a large shrub, with clusters of red berries in winter.

Penstemon cordifolius, a shrubby species, with scarlet flowers on drooping branches.

Symphoricarpus racemeosus, with white and pink blooms and large white fruit, similar to the eastern snowberry.

Philadelphus gordonianus. Large shrub, with spreading branches and white flowers in loose clusters, resembling the cultivated *Syringa.*

Calycanthus occidentalis, an attractive shrub; would thrive in cultivation if planted near water.

Garrya elliptica, a beautiful shrub, considered a great botanical curiosity in all European collections.

Lyonthamnus asplenifolia is a splendid recent addition to our evergreen shrubs, described for the first time last year by Professor Green. It is from Santa Cruz Island. Its beautiful fern-like foliage will be sure to secure admirers.

Ribes speciosum, an ornamental gooseberry. Its exceedingly showy, fuchsia-like blossoms make it valuable for cultivation.

DECIDUOUS SHRUBS.

Although those shrubs bearing persistent foliage are the more sought after and give the greater satisfaction, there are many of the deciduous species that, in spring or summer, during their flowering season, are equally attractive, and should not be pushed aside for their short period of unsightliness and rest.

Let me mention a few of the most ornamental that are already available at most of the principal nurseries:

Cydonia, or Japan quince, *Forsythia*, *Halesia*, *Clethra*, *Exocorda*, the *Tamarisks*, *Spireas*, *Syringas*, *Wigelias*, *Laburnums*, *Deutzias*, the Japan and American *Stuarteas* and *Staphleas*, the *Altheas*, the Japan *Desmodiums*, the large family of *Viburnums*, and the *Punicas*, or ornamental pomegranates and crape myrtles.

THE ROSE.

The justly denominated "queen of flowers" can here be brought to its best estate, the whole family being perfectly at home. A doubt has been expressed that the rosarians of Europe, who have produced our best Teas, would here recognize their children, so superbly are they grown in the favorable atmosphere of California. Less attention has been paid to the introduction of the hybrid perpetuals than to other roses. The most distinctive of the Tea, Bourbon, China, Noisette, Moss, and climbing varieties, are inhabitants of our gardens. Bennett's new hybrid Teas afford great satisfaction in their perfection of flora, color, and perfume. Polyantha roses recently introduced, with their miniature and beautiful shaped flowers in great clusters, are very pleasing. But the Teas are in their glory here, and where grounds are limited, they alone should be planted, as they are rarely out of bloom.

FERNS.

In all grounds where shade and moisture can be obtained, those most delicate and graceful of all plant creations, the ferns, should find a corner. From the most hardy of native and exotic species, a selection can be made that will give perpetual delight.

CACTI.

The *Cacti* are an exceedingly interesting class of plants, needing treatment quite opposite to that of ferns. While most people would not call them ornamental, their strange forms and brilliant flowers entitle them to notice. A little irrigation during our dry season will make them more thrifty.

This lengthy list could be enlarged indefinitely, but with the enumeration shown I trust it has been demonstrated that our choice is bewildering; under our benignant skies an ideal home can be created, that may be as near Eden as ever falls to the lot of mortals, if proper selection from the abundant material and judicious taste in its arrangement be manifested.

Mr. McDonald: Let me say to Santa Barbara that, while we think Santa Rosa can raise flowers unequaled in the State, our visit to Santa Barbara has proven to us that flowers bloom nearly as well, some better than they do in Santa Rosa—especially the rose, for the rose here is unequaled by anything I have ever seen in my life. The only difference I have noticed here in the cultivation of flowers is that here after they put them out they leave nature to do the rest, while we have to apply the arts, and cultivate them more and preserve them better; but I will say, for large and beautiful roses I never saw them surpass those in Santa Barbara.

Mr. Salle: Mr. President, as the Secretary is near you, and so that he may put the question to the meeting, I wish to offer these resolutions:

Resolved, That a vote of thanks be tendered to our esteemed President, Hon. Ellwood Cooper, for his generous courtesy in providing for this Convention the pleasant excursion to "Ellwood," the beautiful possession of Mr. Cooper.

And we recommend to all horticulturists his example of perseverance and sacrifice, in giving to this coast the benefit of experiments of great value to all fruit growers.

And we refer to his splendid possessions at Ellwood as a practical illustration of these experiments.

The Secretary stepped forward and called for a vote on the resolutions, which were adopted unanimously.

PROTECTION TO THE FRUIT INDUSTRY.

The President: The question for the morning is "Protection to the Fruit Industry." I made some reference to it in my opening remarks; this question concerns the Mills Tariff Bill now before Congress. I will state to the audience that the political question of the tariff is not before the Convention, nor can it be discussed, but simply the question of the present tariff, or duties on California fruits. At the fifth Convention held in Los Angeles there was a resolution passed asking Congress to increase the present tariff duty on California fruits; at the last Convention held in Santa Rosa there was a resolution passed asking Congress to leave the duties on those fruits as they now exist. The present duty on almonds is 5 cents per pound, on English walnuts 3 cents, on oranges $1 60 per thousand. The question before the Convention is whether we should pass a resolution asking the United States Congress to leave the duties as they are, or whether we should pass over the subject without taking any action.

Mr. Salle: The last five or six years have witnessed an immense area planted to fruit in the State of California. There has been an immense number of prune trees planted, and many acres planted to the vine. In 1886 there were consumed in the United States about seventy million pounds of dried French prunes. Of that amount the Pacific Coast produced about six million pounds, and there were sixty-four million pounds sent from France. In 1887—I have not seen the figures—the production was not very much greater on the Pacific Coast than it was the year before, but this year there is a large number of prune trees, the result of the planting in 1881 and 1882, that are coming into bearing. We will suppose that the demand in the United States to-day is for about eight million pounds of dried French prunes. Now, if one prune tree will produce twenty-five pounds, and it is not unreasonable to expect that, it only takes three million two hundred thousand trees to produce that immense quantity of fruit. There are to-day planted on the Pacific Coast not less than five million prune trees. Now, gentlemen, when these trees get to bearing what becomes of that industry, if we allow the French prunes to come into the United States and be sold without a protection to the growers here on this coast. There are at least seventy-five million pounds of dried French prunes shipped from France to the United States, and yet we have got trees growing to-day on this coast that will produce more fruit than is consumed in this country in one year. I remarked here yesterday that we had a protection to the orange industry, in the shape of the scale bug, which was going to keep down the supply, but for the prune we must have some other protection from overproduction besides the scale bug; for, as the price is regulated by the supply and demand, the price will go down to nothing. I need not say anything about the vine, for I am not so well posted as to the vineyards; I am a prohibitionist myself, and have not studied that question so thoroughly; but there are gentlemen in the house who are well posted in that direction, and they know that the same facts exist in regard to that industry that it does in regard to prunes. As has been stated by the President, this proposition is for the reduction of the duty on prunes and raisins one half. We do not feel it to-day, because we have not got the quantity to sell; but I tell you this immense number of trees, that have been planted the last few years, as soon as they come into bearing will require the protection, and I think we had better recommend it.

MR. SALLE [continuing]: In view of this fact I offer this resolution:

Resolved, That it is the sense of this Convention that the United States' import duties on green and dried fruit, nuts, and oils, competing with similar products of the Pacific States, should be maintained.

Adopted.

On motion, the following committee was appointed on nomenclature to name a lemon shown by Mr. Frank A. Kimball: A. Scott Chapman, H. K. Snow, and B. M. Lelong.

The Convention here took a recess till half-past one o'clock.

AFTERNOON SESSION.

The Convention reassembled pursuant to adjournment, PRESIDENT COOPER in the chair.

MR. CHAPMAN presented the report of the Committee on Nomenclature, as to the lemon shown by Mr. Kimball, as follows:

MR. PRESIDENT: Your Committee on Nomenclature beg leave to report as follows:

We recommend that a lemon grown from the seed by Mr. Frank A. Kimball, of National City, be named "Agnes."

This lemon we find is of superior quality, medium size, sweet rind, pulp very fine, with strong acid and very few seeds; also very few thorns, which are somewhat short and blunt. The tree is a rapid grower, but drooping in character—medium dwarf.

This lemon has fruited for six years, and has proved to be a good keeper and a very desirable variety.

Very respectfully submitted.

A. SCOTT CHAPMAN,
H. K. SNOW,
B. M. LELONG,
Committee.

Report was, on motion, adopted.

RESOLUTIONS.

Resolved, That the thanks of this Convention be tendered to Dr. J. B. Shaw, of Santa Barbara, for the free use of this hall for the sessions of this Convention.

Adopted.

Resolved, That the Secretary of this Convention be instructed to communicate with the Senators and Representatives from this State in the United States Congress, asking them to request of the Secretary of State that the publications known as "Consular Reports" be furnished the Board of Horticulture of this State, for its library.

Adopted.

Resolved, That the Secretary of the State Board of Horticulture be requested to formulate a series of questions as to insect pests and their remedies, and forward them to the Secretary of State at Washington.

Adopted.

Resolved, That the Committee on Railroad Freights, appointed at the Santa Rosa Convention, be continued until the next State Fruit Growers Convention.

Adopted.

MR. A. SCOTT CHAPMAN introduced the following resolutions, which were adopted:

WHEREAS, California is a great food producer of canned, and bottled, and otherwise prepared goods; and, whereas, many of these are counterfeited by unscrupulous dealers to the detriment of both producer and consumer; and, whereas, the National Pure Food Association has for its object to unify and organize the sentiment of the country in favor of pure food, drink, and drugs, and the establishment of proper laws to remedy these evils; therefore, be it

Resolved, That we, the fruit growers of California here assembled, indorse the action of the aforesaid association, and respectfully urge the citizens of California to become members thereof, and that a copy of these resolutions be forwarded to their office, at 510 Minor Street, Philadelphia, Pennsylvania.

THE NEXT PLACE OF MEETING.

Letters were read from "The Bureau of Immigration," of Yuba and Sutter Counties, and also from the "Sutter County Horticultural Society," inviting the Convention to hold its next session at Marysville; also, from the "Chico Board of Trade," and from the "Board of Trustees," of the town of Chico, inviting the Convention to hold its next session at Chico.

On motion of MR. SALLE, of Pomona, it was resolved that the Convention request the State Board of Horticulture to hold the next biennial meeting at Chico.

CONCLUSION.

A DELEGATE: Mr. President, before we close I wish to offer this resolution:

Resolved, That the thanks of the Convention be extended to the President and Secretary, and the officers of this Convention, for the able and efficient manner in which they have discharged their duties.

Adopted.

This finishing the programme, the Convention adjourned *sine die.*

B. M. LELONG,
Secretary.

REPORT OF THE STATE INSPECTOR OF FRUIT PESTS.

California Peach Root Borer; history of and remedy for. Strawberry Root Borer. The Sun-Scald Beetle. The Red Orange Scale. The Pernicious Scale. Species of Trees Affected. Natural Enemies of Icerya. Banding of Trunks. Gas Remedy. Mode of Treatment. The Process. Doses According to Size of Trees. Modes of Operating Dry Gas Process. The Titus Fumigator. The Generator. Cost of Treatment. Modes of Preparing Washes. Caustics, the object of their use. Predaceous and Parasitic Insects. Podabrus Beetles. Lace-Wing Flies. Syrphus Flies.

Supplementary Report.—Pomona. Successful Olive Grafting. San Joaquin County. Orchards on the Calaveras River. Islands along the San Joaquin River. Colusa County. Oroville. The Olive without Irrigation. El Dorado County. Diamond Springs. Placerville. Vaca Valley. Ontario. Miscellaneous Matter.

CALIFORNIA PEACH ROOT BORER.*

(*Sannania pacifica.*)

I regret being unable to furnish a full scientific description of this pest, to accompany the engravings below. It is a new species, but Professor Riley, to whom the specimen was submitted, has not described it yet.

No. 1, the larva, resembles the larvæ of other *Ægerias*. Its color is whitish and the head brown. When well grown it is fully one inch and a quarter long. No. 2 represents the cocoon, which, like other *Ægerias*, is spun from the castings of the worm. It is dark brown and is generally found imbedded in the bark. Projecting from one end of this cocoon is the last molt of the insect left behind in hatching. Nos. 3 and 4 are representations of the male and female. Here, the distinction between the Eastern species, *Ægeria exitiosa*, and this one, is plain. In the former there is much greater difference in the size of the sexes, the female being much larger in proportion, while with the species in question the difference in size is not so great. The color of the body of the male is a beautiful

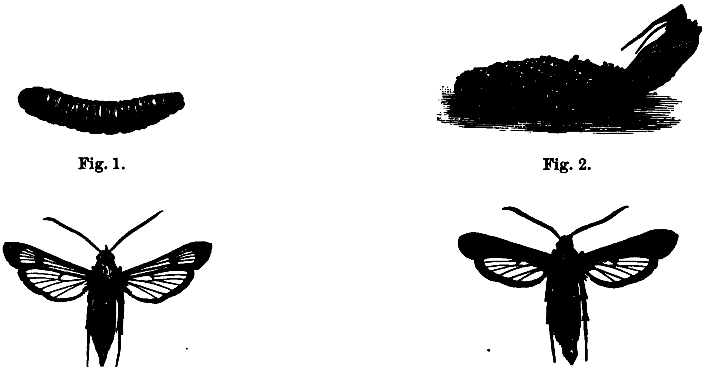
Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.

Fig. 1, larva; Fig. 2, chrysalis; Fig. 3, male; Fig. 4, female. All natural size.

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*Under date of September fourth, Professor Riley writes: The *Ægeriid*, to which you refer, is not yet described. I intend to describe it as *Sannania pacifica*, as it connects through *S. Fitchi* with *S. exitiosa*, the eastern peach borer.

steel blue. The legs have tufts of light yellow, but there are no light colored bands on the abdomen, as on the eastern species. The almost transparent wings are edged with steel blue. The female is slightly larger, with heavier body, abdomen dark steel blue, tufts on the anal end conspicuous and black. The upper wings are dark steel blue, the lower, transparent.

The habits of this insect are similar to those of the eastern peach root borer, yet it differs essentially, and in such manner that it must be considered less dangerous.

The tunnels made by this borer are almost vertical, varying from four to eight inches in depth by three to four inches in width, and the disposition to girdle the tree does not seem to be so apparent as by the eastern borers. Frequently five or six borers were found which had not girdled the tree yet. Furthermore, it does not seem to work above ground. Its presence was noted especially on heavier land, while on very light sandy soil it was notably absent. Its presence is also invariably indicated by copious gum exudations below ground. Its preference is peach roots, yet we found instances where cherries (Mazzard stock) had been affected.

Remedies.

The moth lays its eggs at the base of the tree, and by preventing access to this we have a remedy. The fact of their presence being hardly felt on light, sandy soil, points to the advisability of the placing of sand from four to five inches deep around the base of the tree; but better than this would be a complete wrapping of the trunk, from several inches downward to six inches upward, with stout paper, or paraffine paper, which is tied well or held in place by a collar of mortar.

Remove the earth from around the tree to the depth of a few inches and a few inches from the tree, and fill the basin with air-slaked lime, piling it up a couple of inches above ground. Possibly ashes may serve the same purpose. All trees affected should have the wounds plastered over with damp clay after all the worms have been killed, and then protected as indicated above.

We do not favor the use of gas lime—it may do as much harm as the borers themselves.

STRAWBERRY ROOT BORER.

(*Ægeria impropria*, H. Edwards.)

Fore winged, bronze black, with the internal margin rather broad, and inclosing an orange line. The intronervular marks of the posterior margin are also orange, as are the edges of the discal mark. Fingers of both wings, bronze black. Antennæ, steel blue. Head and thorax, brownish black, with the collar and narrow lateral stripes pale yellow. Abdomen, with second and fourth segments, edged posteriorly with pale yellow. Caudal tuft, black above, orange at the sides, black beneath, except the tip which is orange. Palpi, yellow above, black beneath; tip, also black. Legs as in *Ag. perplex.*

This insect is found in various portions of the State, doing considerable damage, forcing the growers to resort to replanting much earlier than otherwise would be necessary. The life history of this insect has been but imperfectly studied so as to be a proper guide for means of prevention. The grub (see figure) passes the winter through in the larva state, feeding on the root. In June, probably the mature insect issues, which lays its eggs right at the edge of the ground, after the manner of other *Ægerias*. The common practice of flooding the vines has a great tendency to kill out the worms, and if the water was retained, say four to five days during the winter, all over the plants, doubtless all the larvæ would be killed.

Fig. 5.

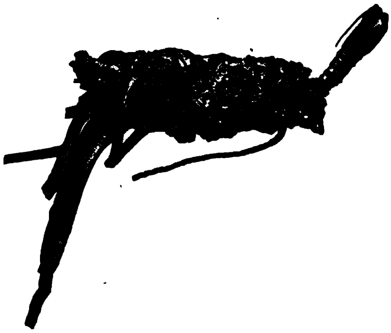


Fig. 6.

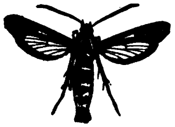


Fig. 7.

Fig. 5, larva; 6, root of strawberry with chrysalis showing the characteristic way the moth escapes from the chrysalis; 7, imago.

THE SUN–SCALD BEETLE.

(*Xyloborus xylographus.*)

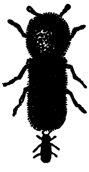


Fig. 8.

For some years it has been noticed that early in the spring, trees, especially plums and apples, have suddenly shown all symptoms of dying. A close examination would generally reveal the bark clear to the sap wood in state of putrefaction. Invariably the tree also would be found more or less pierced with minute holes, and in this the little beetle, figured here, would be joined.

The close resemblance of this to the eastern blight beetle led me to believe that this insect was the primary cause of the tree failing, but I have recently arrived at the conclusion that the tree has been damaged to such an extent by the sun, that the sap being then rich in sugar has fermented, causing decay, and that the insect has been attracted from this cause.

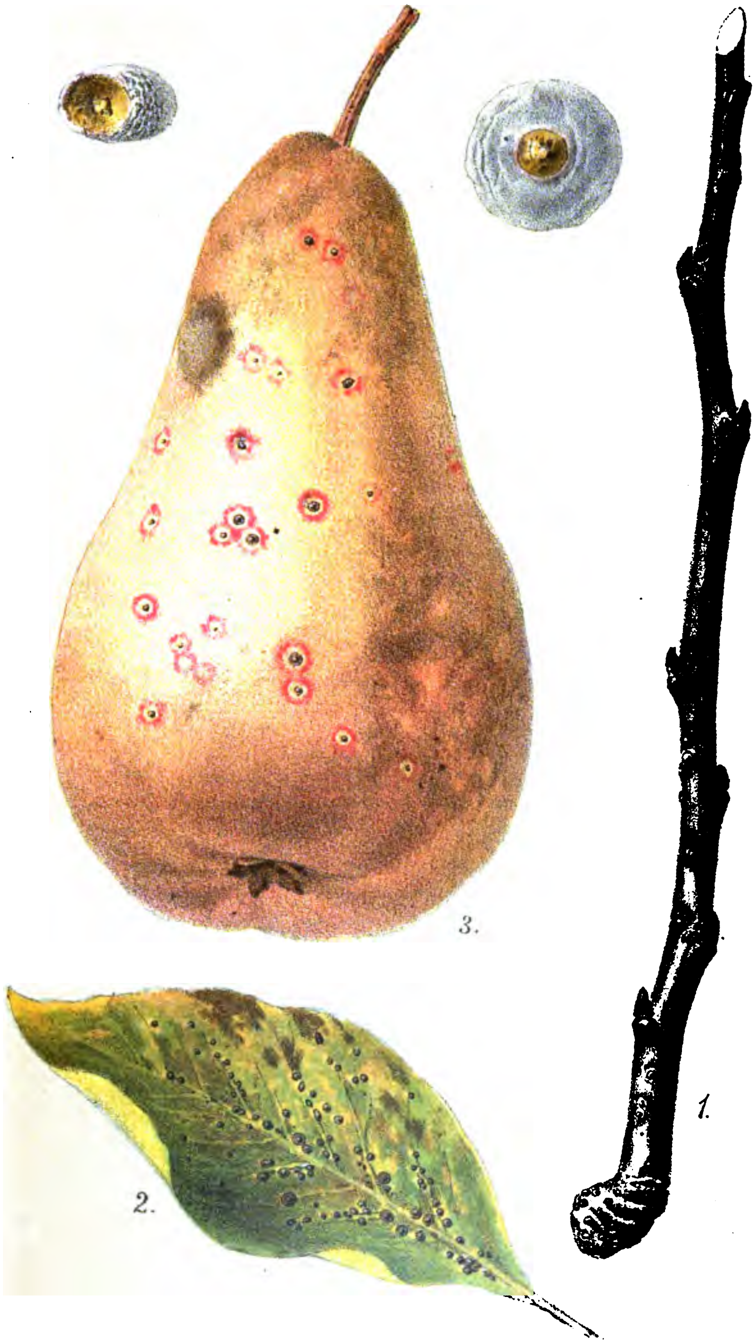
The remedy, therefore, here again is having the trunk well protected. If trees are seen to be affected in this manner, they must be cut back to a few branches at once and the wound dressed with grafting wax.

RED ORANGE SCALE.

(*Aspidiotus auranti.*)

The great importance of knowing this, one of the most destructive species of scale insects, causes me to reproduce the plates of two varieties of orange scale; true type, Plate III. This variety was evidently brought to Los Angeles from Australia, where it is considered by far the most destructive scale. This variety infests all parts of the tree alike—leaf, branch, and fruit. The massing of the scale along the shoots causes them to wither from the tips downward, and afterwards causes the tree to lose all its leaves. In color, the scale is darker than the other variety in Plate IV.

PLATE I.

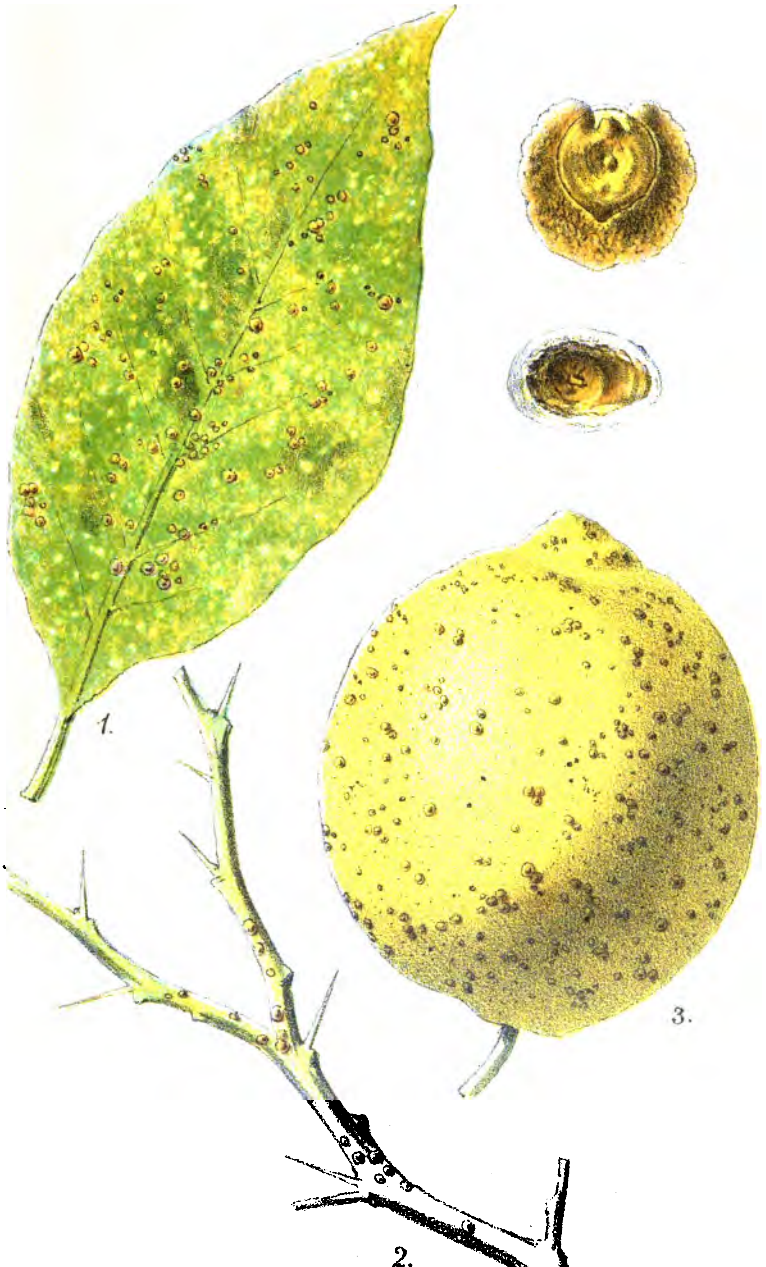


Lith. Britton & Rey. S. F.

Aspidiotus Perniciosus (Comstock.)

PERNICIOUS SCALE

PLATE II.

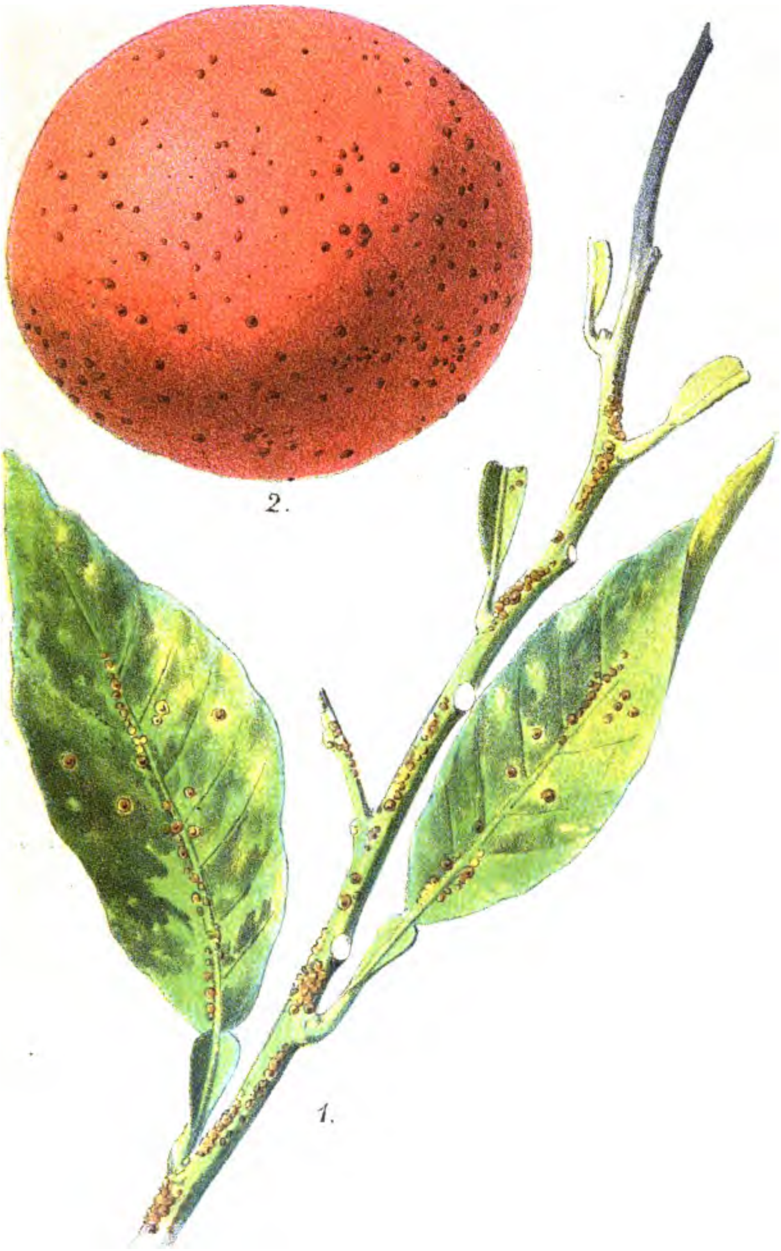


Lith. Britton & Rey, S. F.

Aspidiotus Auranti.

RED ORANGE SCALE (Japanese Type.)

PLATE III.

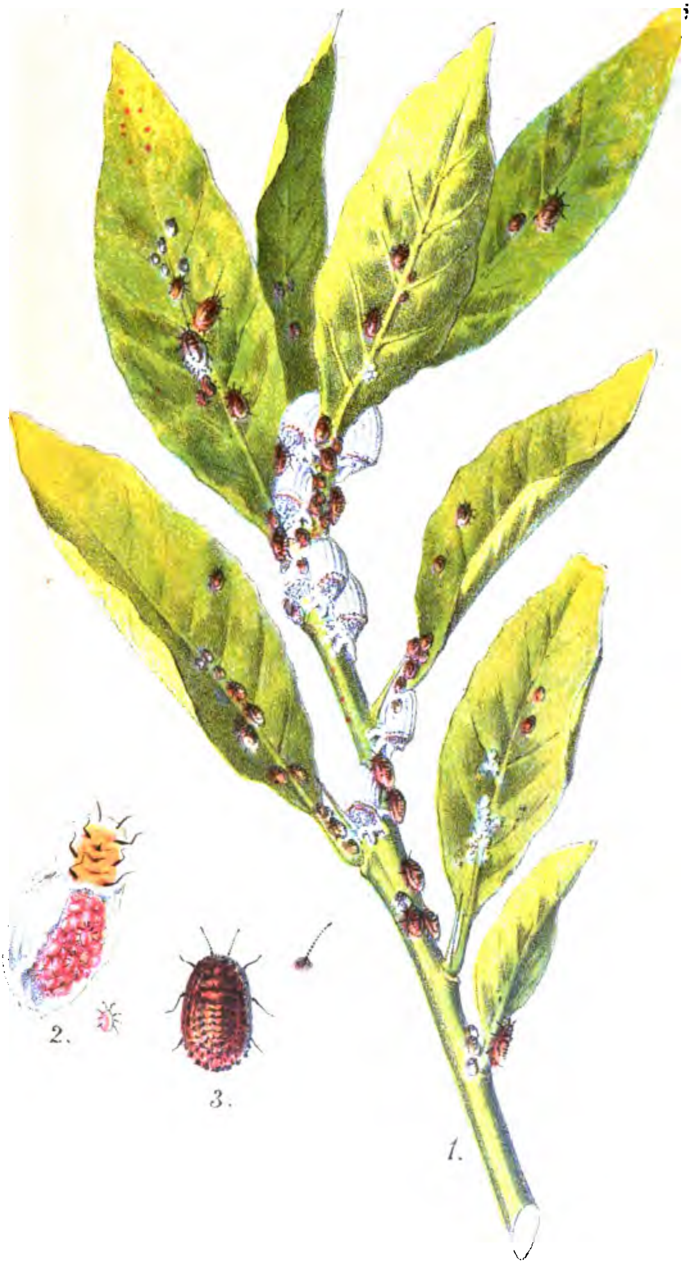


Lith.. Britton & Rey, S. F.

Aspidiotus Auranti (Maskell.)

RED ORANGE SCALE–TRUE TYPE (Australia.)

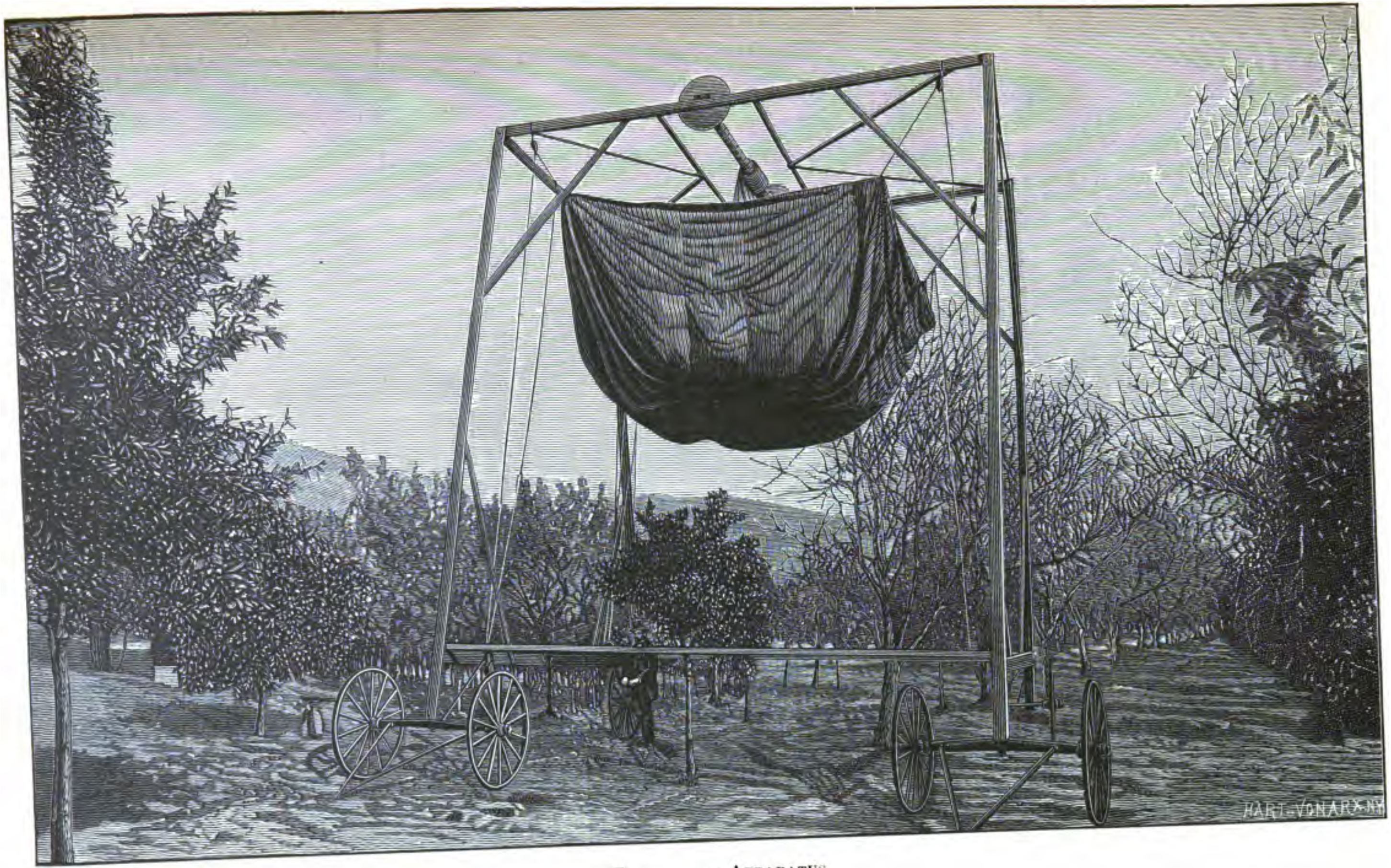
PLATE IV.



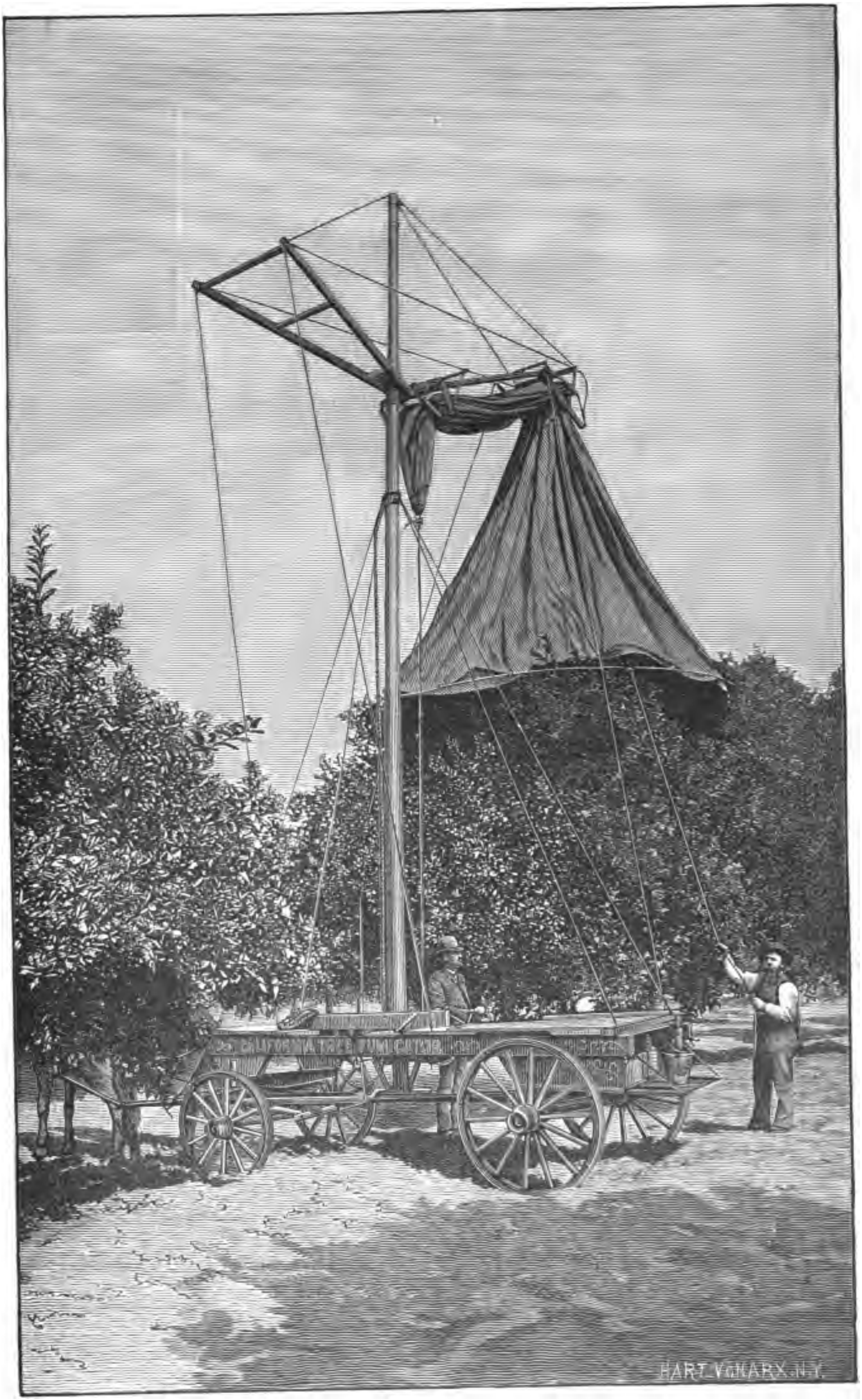
Lith. Britton & Rey. S. F.

Icerya Purchasi (Maskell.)

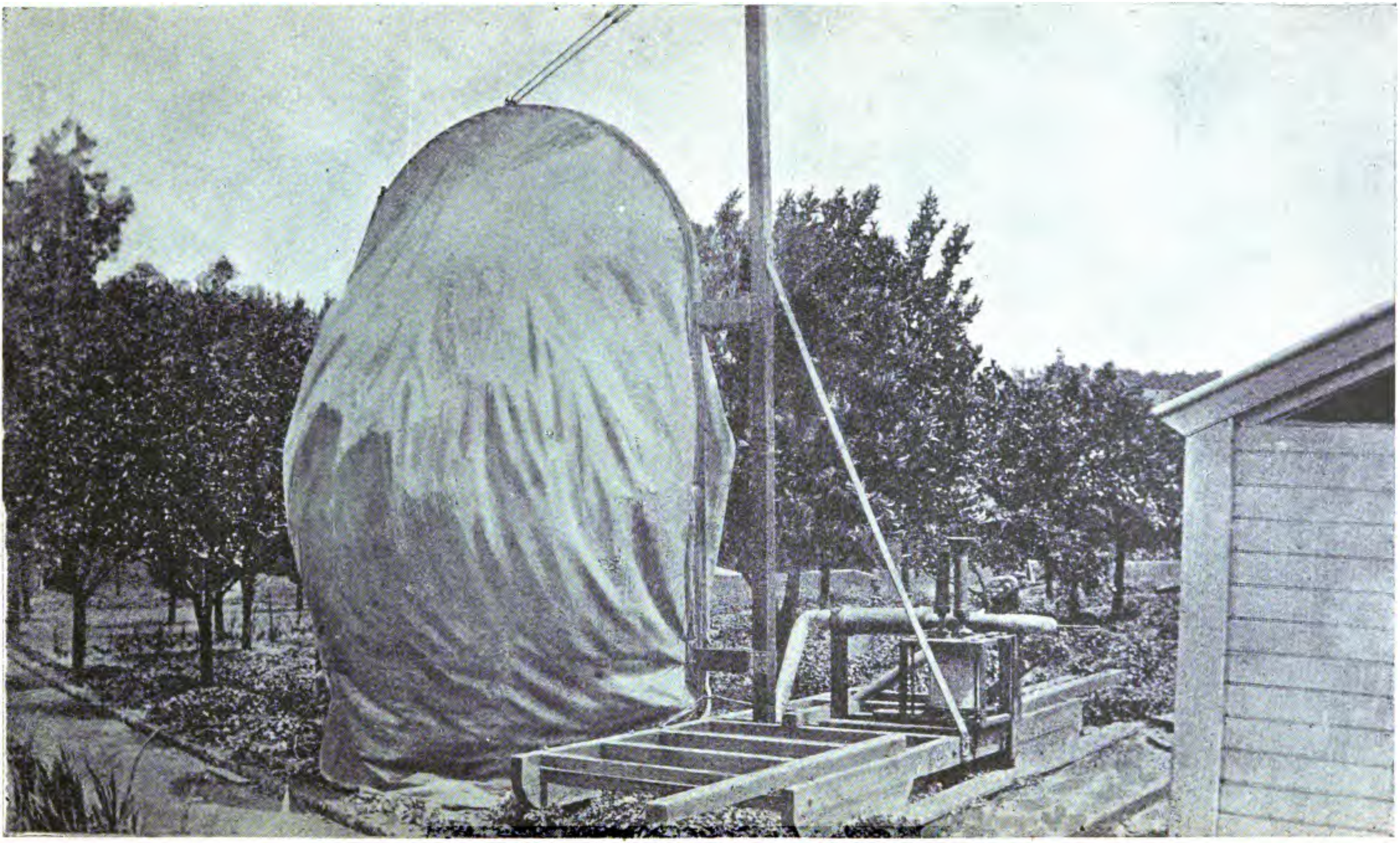
FLUTED OR COTTONY CUSHION SCALE



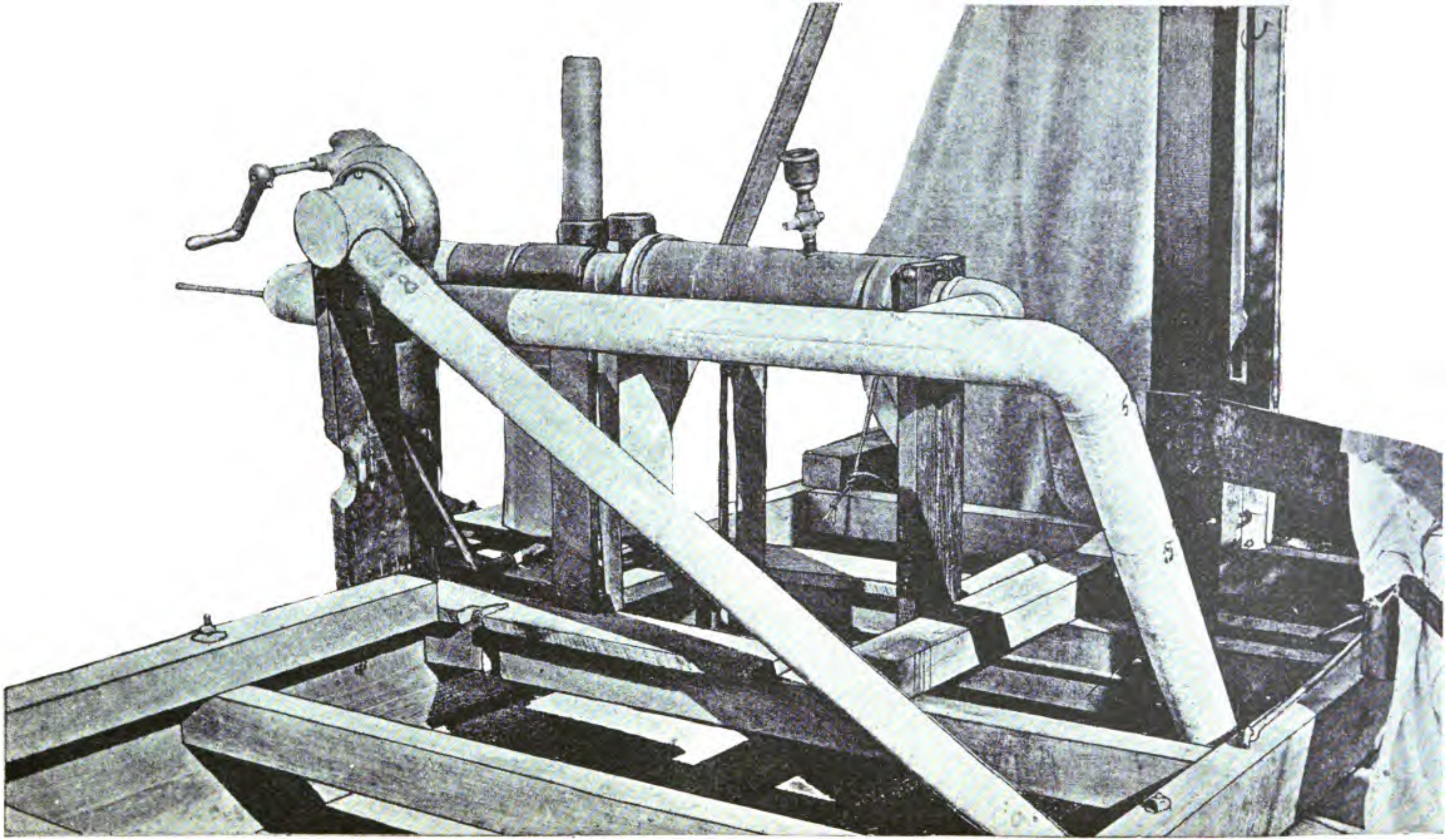
TITUS FUMIGATING APPARATUS.



Wolfskill Fumigating Apparatus.



Culver Fumigating Apparatus and Morse Generator.



Morse Generator.

Plate II aims at representing the natural appearance of the true type. The branch at No. 1 shows the characteristic dying off.

Plate III is a representation of the light colored red scale, by some called the San Gabriel scale, because of its prevalence in the valley of that name. This variety has evidences of having been imported from Japan, as orange trees brought from that country are always more or less infested with it. Although a most persistent and difficult scale to eradicate, it does not seem to have proved as formidable an enemy as the true type.

From what I can learn about this scale in Japan, it appears that it is not troublesome there, at least the native gardeners with whom I have conversed, do not consider it so. The slight damage done must undoubtedly be attributed to parasites keeping the scale in check. These it might do well to import.

The following is a description of the red orange scale taken from Professor Comstock's report: Scale of female, light gray, quite translucent, its apparent color depending on the scale, varying underneath from light greenish yellow to a bright reddish brown; the central third (that part which covers the second skin) is as dark and usually darker than the remainder of the scale; and when the female is fully grown the peculiar reniform body is discernable through the scale, causing the darker part of the outer two thirds of the scale to appear like a broken ring. The female is light yellow in color in the adolescent stages, becoming brownish as it reaches maturity. When fully developed, the thorax extends backwards in a large rounded lobe on each side, projecting beyond the extremity of the abdomen and giving the body a reniform shape. The male is a light yellow, with the thoracic band brown and eyes purplish black.

THE PERNICIOUS SCALE.

(*Aspidiotus perniciosus.*)

The continued spread of this scale to new regions of this State, and the ignorance of a great many, as regards the appearance of this, the worst pest of deciduous fruit trees, have caused us to reproduce Plate I. The pear shows the distinct red marks left around the spot wherever the insect stings, which is especially conspicuous on certain varieties of pears. The branch also shows it quite plainly. When trees are badly infested, the bark becomes completely discolored, turning a deep red. The color of the full grown covered scale is grayish, the nipple darker; the young scales appear like fly specks. The female scale itself is pale yellow and almost circular in outline. The young larvæ are quite active, of a pale yellow color, and barely perceptible with the naked eye. The first hatching is generally in May, or, as it might be put, when the cherries are turning color. Another occurs in July, yet another in September or October. The young scale finds lodgment under the buds, and in this way often escapes detection, and is thus carried on young nursery stock.

Species of Trees Affected.

This scale affects peach, plum, apple, pear, and various other trees, but there is, nevertheless, a great difference in the severity of its attacks among the different varieties of fruit trees mentioned. I have sought to discover the reason of this preference, and I believe that it is due chiefly to the texture of the bark; thus, the Napoleon Biggarreau cherry has a thick porous bark, and suffers much, and the Black Tartarian has a hard bark and suffers scarcely any. The same seems to hold true with certain varieties of pears, yet there seems to be exceptions to this.

Natural Enemies.

In former reports we have dwelt on the subject of the lady bug, *Chilocorus*, as an important help. Of true parasites, until lately, but few have been observed. Two years ago I saw traces of their work in Fresno, but obtained no specimens. It appears, however, that in Los Angeles County there has been a species of *Aphilinus*, a small parasitic fly, doing much good, so much in fact, I learned from Mr. A. Craw, that it has exterminated the scale almost completely in a badly infested orchard. This species of *Aphilinus* is a new one, and has been forwarded to Mr. L. O. Howard for determination.

OTHER SCALE INSECTS.

(*Lecanium Sp.*)

For the last few years a native species of *Lecanium* has been spreading in certain parts of the bay counties. This scale resembles somewhat the soft orange scale, but differs materially, one of the principal differences being that the former is viviparous (that is, the young appear directly from the body of the mother), while the latter shows the presence of eggs for some time. For want of better scientific description, which will appear later with its correct name, I give this: Eggs, white; female's larva resembling closely the *L. olea*, but is even smaller, and when first fastened to the leaves is so transparent that its presence can only be detected by a glass and by the stickiness of the leaves. The eggs hatch generally in June, and the young scatter in a few days. The insects do not grow very much the first six months, but toward spring and in early summer increase enormously in size, and in May appear as beadlike projections along the branches, often reaching a diameter of one fifth of an inch. There is but one brood in the season, and they all seem to hatch nearly the same time.

Remedies.

For summer treatment, immediately after the fruit has been gathered, the summer wash recommended under the head of the pernicious scale is recommended.

For winter treatment, two thirds of the strength of the solution is recommended for the same scale.

This scale affects especially prunes, plums, apricots, peaches, but also the pear.

FLUTED OR COTTONY CUSHION SCALE.

(*Icerya purchasi.*)

In our last biennial report a full scientific description appeared of this insect, and as this will be republished in a small treatise I am just preparing, I will only refer to the colored plate, with a short, popular description.

Plate IV, Fig. 1, gives a general idea of the insect as it is found on a Japanese dwarf orange tree, natural size. Figure 2 shows a female much enlarged; the egg sack, which covers the numerous pink, oval eggs, is partly laid open, showing these and some of the newly hatched young; beside the figure is a young, enlarged. Figure 3 shows the female full-grown, enlarged. The young molt a number of times, and when a few weeks seated along the leaves, the skin comes off as a white sack, as it is attempted to show on the plate. Trees infested soon become a disgusting sight, owing to the black smut which grows rapidly on the freely exuded honey dew, the leaves gradually become yellow and at last drop off.

The fluted scale infests chiefly evergreen trees, and seems to have a special liking for Australian plants, notably the Acacia tribe, which, on account of this insect, in many sections of the State has been replaced by other trees. Of fruit trees, the orange family is especially subject to its attacks, and its ravages in this country, as well as in South Africa, have been very severe. But although there exists many plants which are but little affected by this scale, there are scarcely any on which it may not find lodgment for some time, until a better suited subject is found. Falling to the ground, they will exist on weeds and grass for some time, on some, such as nettles, thriving most wonderfully. It is this habit that has made this insect the most difficult to exterminate when well established.

Natural Enemies of Icerya.

During the last few years a great deal of interest has been taken in the subject of parasites on scale insects, as well as other enemies of these foes of vegetation. In Professor Riley's report of 1886 a few insects are mentioned as preying upon this insect, the most abundant of these being a species of moth, *Blastobasis iceryaella*, in its larvæ state, probably feeding on living scale. On the eggs, Mr. Koebele records the ambiguous ladybug, as also a tenebroid beetle, *Blabstinus brevicollis*, feeding. He found, also, a large, brilliant red mite, which I, too, have seen very plentiful among the *Icerya*. To this must be added the larva of a lace-winged fly, *Chrysopa*, not sufficiently identified to be named, and the larva of *Scymnus marginicollis*, a small gray-colored ladybug. A number of the latter were observed by Mr. A. S. Chapman and myself a few years ago last summer. The larvæ were imbedded in the egg-sacs, and had eaten portions of them. I am not aware that this insect has been observed before in this capacity.

However, all these insects seem to have had no perceptible effect on the fluted scale. Of true parasites, a single instance is recorded by Professor Riley of a hynenopterous insect, which Mr. L. O. Howard has named *Isodromus icerya*. It is a minute chalcid fly. So far it has not been observed as exerting any influence in restraining the *Icerya*.

In Other Countries.

While in California we have been but little favored with natural enemies of *Icerya*, it seems that other countries have been more fortunate. In the interesting treatise by Miss E. Ormerod, of England, my attention was first drawn to the matter. In consequence, I began a correspondence with Mr. Frazer S. Crawford, of Adelaide, South Australia.

In a paper, read at the Santa Barbara Convention of 1888, I gave an outline of the result of this correspondence. Since then I have received two packages of insects from Mr. Crawford, found parasitic by him on both the large native *Coccid monophlebus* and the *Icerya*, and the presumption is, that the scarcity of the *Icerya* in that country is partially due to the presence of these parasites. The first package arrived in April of last year, having been sent by mail. Being absent myself, at the time in Los Angeles, the specimens were kindly taken in charge by Mr. Koebele, in Alameda, and confined in a jar filled with *Icerya*; the supply of parasites being so small that it was thought that this manner of preserving them was best. A few flies were living when the box was opened by Mr. Koebele. Probably more escaped when it was opened at the Custom House. The bugs in which the parasites were sent were all dead and dried up, yet twenty days after they arrived Mr. Koebele observed flies hatching out from the dead. As many as twenty flies had been found in one of these *Monophlebi*. The vitality of these parasites seemed to have been impaired, and in spite of Mr. Koebele's efforts they all gradually died. At the same time Mr. Coquillett received also some specimens from Mr. Crawford. These had been sent on Professor Riley's suggestion. These were confined on an orange tree inclosed in a fine net. At first, these seemed to do well, but after awhile they, too, died, evidently leaving no progeny. After these failures, I concluded to try another method of transportation, and, through the kindness of Mr. J. D. Spreckels of the Oceanic Steamship Company, I was promised permission to have a consignment sent by the purser of the steamer direct, the package to be placed in the ice chest, so as to avoid the climatic changes of the voyage across the line. Mr. Crawford again collected a small colony of *Monophlebi* and *Icerya*, the latter being especially scarce. The box was well cared for and arrived on the steamer Zealandia in the middle of June. On opening the box, it was found that one fly had already hatched, and that one of the *Monophlebus* was alive. To take advantage of these favorable conditions, a large wire cage with very small meshes, twenty to the square inch, was immediately ordered, but as this could not be made ready in time, the little colony was tied up in a branch of a laurel tree, thickly infested with *Icerya*. At the time a number of flies were hatched, but had all died. A week after, the cage was ready and was placed over the tree. On examination but little change seemed to have taken place in the condition of the bugs (*Monophlebi*), merely some of them having dried up. Examining them again a week later, I found, upon cutting open one of these dried bugs, a large number of healthy cocoons. It is therefore to be hoped that some of these may be enabled to adapt themselves to the changed conditions and lay the foundations for a future colony.

There seems to be no serious obstacle in the way of introducing these parasites from Australia, except their remarkable scarcity. And this, in spite of his endeavors, has prevented Mr. Crawford from sending more than a few specimens. The mission of Mr. Albert Koebele, who has been chosen by Professor Riley to go to Australia, is therefore of extreme importance. And in this choice, Professor Riley is to be congratulated, as, perhaps, no other person on this coast is better adapted for such a mission. We shall follow his movements with the keenest interest.

From South Africa I have heard nothing, since the letter published in my Santa Barbara paper, but I trust that in due time the promised ladybugs therein mentioned may arrive.

As regards the feasibility of bringing from Hermosillo any of the insects presumed to be parasites, it would seem to be an easy matter. But by late advice from Mr. Wolleb, who has since returned from that place, I have learned that the fluted scale again has increased greatly. The question then is, what was the check exerted on it a year ago, when it apparently disappeared altogether. To be settled, the question requires investigation on the spot. We also learn from Mr. Wolleb that the fluted scale was not noticed in Hermosillo previous to 1884, and that it was found on a twenty-year old citron tree. Whence the insect came, nobody can conjecture, as no trees are imported to that State.

The Original Home of the Fluted Scale.

In spite of the diligent inquiries sent to various parts of the world by different naturalists, this question still remains unsolved. But indications are that it probably is at home in the South Pacific region. Professor Riley's late investigations have convinced him that the sugar louse of Mauritius, *Icerya sacchari* and *Icerya purchasi* are distinct species, as Mr. Maskell contended.

Remedies.

There are no species of insects existing in this State on which so many different remedies have been tried, and some of the simplest have proved the best.

Caustic solutions have the disadvantage of hurting the tree, and are not especially adapted to penetrate into the egg sack, which, on account of its peculiar texture, repels most liquids.

Various soap solutions, some containing kerosene and some whale oil, have proved fair remedies, but cannot, in my opinion, be equaled by the resin solutions, of which I give three formulas. The first was first tried by Mr. A. Koebele; the second by Alexander Craw, of Los Angeles; the third has been given me by Mr. L. D. Green, of Sacramento. From personal experiments with them all, I am well satisfied with them.

Recipe No. 1.—Four pounds of resin; three pounds of sal soda; water to make thirty-six pints. Dissolve the sal soda in a few pints of water; when thoroughly dissolved add the resin. Heat until dissolved, and add water finally. Use two quarts of solution to the gallon of water. Use at a temperature of about 100° Fahrenheit.

Recipe No. 2.—One pound of resin; one hundred gallons of water. Prepare as above.

As, perhaps, owing to the nature of the caustic, the leaves are sometimes liable to be affected, I should recommend the spraying of the trees with pure water liberally two or three days after the applications of the resin solutions; the water will free the pores of the leaves. These solutions being cheap they may be used liberally, and two or three treatments a year would, I think, keep the trees in fair order.

Recipe No. 3.—Sixty pounds of resin; sixty pounds of tallow; ten pounds of potash, dissolved in ten gallons of water; ten pounds of caustic soda (Greenbank, 98 per cent). Dissolve the resin and tallow; when dissolved, add caustic water slowly. After the mixture is made, add ten gallons of water. Use at the rate of one gallon of mixture to ten gallons of water.

In the case of the black scale I have found the addition of sulphide of soda, at the rate of one gallon to seventy-five of resin solution, the strength of sulphide being one pound of concentrated lye to two pounds of sulphur, beneficial, and I should recommend the trial of this for *Icerya*. In several orchards in Santa Barbara cold water has been sprayed on the trees with great power, but while it must be considered superior to many of the injurious ingredients used, it is only by its constant application that trees can be kept clean.

Banding of the Trunks.

A most essential help in checking the fluted scale spreading, whatever method of cleaning is used, is the placing of bands on the trunks of the trees, say six inches from the ground. For this purpose strips of sheepskin, the hairy side turned in and the smooth side out, have proved valuable. The bands should be drawn as tight as possible, and the outside covered with a mixture of molasses or printers' ink, or any substance that will remain sticky for some time. The minute scales which are constantly traveling during the summer time will be either caught in the sticky solution or find lodgment in the wool. From time to time the bands must be taken off and dipped in scalding water and carefully replaced. The portion of the trunk below should be washed with a strong resin solution three times as strong as any recommended above.

Gas Remedies.

In my last report was given an account of the various experiments made by different parties. In the recently published report of Professor Riley, United States Entomologist, Mr. D. W. Coquillett, of Los Angeles, gives an exhaustive account of experiments with various gases; but I am of the opinion that none will supersede the hydrocyanic gas first used by Messrs. Craw, Wolfskill, and Coquillett, and later discovered and recommended by F. W. Morse, of the University of California.

The opinion then expressed, that no doubt appliances which would make the application of the hydrocyanic gas void of danger and cheapen the process, on the whole, I am glad to say, has been fulfilled, although my sanguine expectation, that all eggs could be killed, has failed. While it may be done, and has been done, so many intervening causes, especially the difficulty of keeping a tent gas tight, in a treatment of an orchard, we dare say the only practical way of exterminating the insect will be by two treatments, say four weeks apart. The first treatment would exterminate large bugs, everything not in the egg state, and the majority of the eggs. The second, all the remainder—the eggs then being hatched.

Modes of Treatment.

In Bulletin No. 73, Mr. Morse gives full directions for using the gas. To avoid the injury to the foliage, which, according to the later investigations of Mr. Morse, is due to free ammonia gas, Mr. Morse employed carbonic acid gas which was generated simultaneously by pouring the mixture of cyanide and carbonate solution together into the receiver.

The Process.

I append the following from Bulletin No. 73, of Experimental Station of Berkeley:

Solutions.—The cyanide of potassium solution (*not* the "mining cyanide") is prepared by dissolving the salt in the proportion of ten pounds to two gallons of water. Place the cyanide in the vessel in which you wish to make the solution and add the water to it, bring nearly to boiling with occasional stirring, and let it cool. It is best to make the solution one or two days before using, in order to avoid as much as possible the stronger odor of a freshly prepared solution.

In the prescribed dose an excess of acid has been recommended, in order that complete action shall always take place. It is desirable to test the residue occasionally, to be satisfied that the work is complete. This is done by adding a little more acid and noting whether boiling or effervescence takes place upon stirring; care being taken not to mistake the effervescence from the material accidentally gathered on the sides of the cylinder during the operation for that of material which should have been acted upon in the bottom of the cylinder.

DOSES ACCORDING TO SIZE OF TREES.

The regulation of the doses for the different sized trees, so as to produce uniform treatment, is calculated on the basis of the results of the experiments which determined the amount of each constituent for a twelve-foot tree. The following table indicates the amounts for trees of different dimensions of top, based upon the rates of cubical contents.

The amount of material for each dose differs from that previously recommended (Bulletin 71), by a decrease of one fourth in the amount of soda, and a slight change in the acid; the cyanide remains the same. Varying amounts of soda were used, showing quite clearly that a decrease of one fourth was possible, but further than this an appreciable lessening in the preservative effect was noticable:

SIZE OF TREE.	Cyanide of Potassium—Fluid Ounces.	Bicarbonate of Soda—Pounds.	Sulphuric Acid—Fluid Ounces.
Five feet	1.6	.1	.9
Six feet	2.5	.2	1.6
Seven feet	4.0	.3	2.6
Eight feet	6.0	.4	3.8
Nine feet	8.5	.5	5.5
Ten feet	11.5	.7	7.5
Eleven feet	15.5	.9	9.9
Twelve feet	20.0	1.1	12.9
Thirteen feet	25.4	1.5	16.5
Fourteen feet	31.6	1.9	20.5
Fifteen feet	39.2	2.2	25.3
Sixteen feet	47.5	2.6	30.7
Seventeen feet	57.5	3.1	37.8
Eighteen feet	67.7	3.8	43.7
Nineteen feet	70.9	4.4	51.3
Twenty feet	90.5	5.2	60.0

The prescribed doses for small trees will be found too small, unless the trees are very low. The calculations are all based upon the supposition that the trees are nearly spherical in shape; but in most cases it will be found that the trees of small dimensions have most of the branches raised fully four or five feet from the ground, thus leaving a large volume on the inside of the tent unoccupied. Due allowance must be made when the height of the tree is so much greater than its diameter.

MODE OF OPERATING.

Place the desired amount of acid in the acid receiver, then put the required amount of soda in a convenient vessel (a gallon measure serves the purpose well), and add water to bring it to a thin paste, stirring well to get rid of all the lumps, before the cyanide solution is added. Mix the cyanide solution and the soda paste so that the undissolved soda will remain evenly distributed through the mixture. Pour into the cyanide receiver and allow it to run slowly and *regularly* upon the acid which has previously been run into the generator. As soon as the cyanide solution begins to enter the generator, the blower should be turned slowly, and continued until all the material is run in and violent action ceased. This usually takes a minute or so after the materials have united. Then follow with violent blowing for a minute or so, and allow to rest until about fifteen minutes from the beginning of the treatment, when violent blowing is repeated for one minute. The time occupied in running in the mixture should be about as follows for the different sized trees:

Ten-foot tree	4 minutes.
Eleven-foot tree	5 minutes.
Twelve-foot tree	5.5 minutes.
Thirteen-foot tree	6 minutes.
Fourteen-foot tree	7 minutes.
Fifteen-foot tree	7.5 minutes.
Sixteen-foot tree	8 minutes.
Seventeen-foot tree	9 minutes.
Eighteen-foot tree	10 minutes.

It is quite important that the *time of injecting shall be closely observed*, and should be lengthened rather than shortened. No time will be saved by hurrying this part of the treatment, for if run in too fast lumps will be formed which will take some time to be completely acted upon by the acid. If the time is slightly lengthened no serious results will follow. Some of the largest doses have been completely acted upon in less than fifteen minutes, thus making it possible for a single generator to serve two tents when the prescribed time of exposure is adopted. It is advisable to continue the treatment of a single tree for about thirty minutes, although the time may be slightly shortened when two tents are used.

This treatment can be used when the temperature does not rise much above 70° F., but when it becomes much higher it will affect the foliage To avoid this trouble it is suggested to do the work during the cooler portion of the year.

DRY GAS PROCESS.

In Mr. Coquillett's report to Professor Riley, in reviewing the different processes, he favors the method of passing the gas through sulphuric acid, which method he describes as follows, under the name of "The Dry Gas," his idea being that the damage done by hydrocyanic gas, when generated, is due to moisture, which carries particles with it:

> I have already alluded above to the fact that the drier the gas the less injurious was the effect upon the tree confined in it, and it occurred to me that the gas might be generated in the usual way, by acting with sulphuric acid upon potassium cyanide dissolved in water, and afterwards be dried by passing it through some medium that would deprive it of its moisture. Knowing the great avidity of sulphuric acid for moisture, I determined to use it as a drier for the gas, and several tests which I have made with this gas dried in this way prove that it does not injure the foliage of orange trees confined in it, while it is just as fatal to the scale insects as is the moist gas. The density of the acid through which the gas had passed was lowered about one degree, as indicated by the hydrometer; but this would not prevent its use for generating the gas.
>
> The cyanide is dissolved by boiling in water for a few minutes, using one gallon of water for each five pounds of cyanide. It is desirable to use as little water as possible for this purpose, but the quantity could not be very much reduced from that given above. I have tried to dissolve five pounds of the cyanide in half a gallon of water, but all of the cyanide had not dissolved after half an hour's boiling. For every ounce of the cyanide solution use half an ounce of sulphuric acid, but it is always desirable to add some of the acid to the prescribed dose, in order that there may be an excess of the acid. No evil results will follow if double the proper quantity of the acid were to be used, whereas, if less than the proper quantity were used, the whole of the gas would not be evolved from the cyanide solution; hence the advisability of always using an excess of the acid.
>
> In generating the gas the acid should flow upon the cyanide solution in a very fine stream. When they come in contact violent action at once takes place, and the gas is rapidly given off in the form of a dense, whitish fog, resembling smoke, and possessing a peculiar odor. When this gas, diluted with air, is inhaled, it produces a dryness in the mouth and throat.
>
> It is impossible to give any definite rule for using the different ingredients that will apply to the differently sized trees, owing to the fact that trees of the same height may have a varying diameter of top; thus orange trees twelve feet tall may have a diameter of top ranging all the way from six to ten feet. The manner in which the tree is pruned will also make a difference in the quantity of the ingredients to be used, some trees being allowed to branch almost from the ground, while others are trimmed up from three to five feet from the ground.
>
> The following table, based upon numerous experiments which I have made on orange trees under a tent ten feet tall, and having a transverse diameter of ten feet, will give a good idea of the proper quantities of each ingredient to be used in treating citrus trees:

Height—In Feet.	Diameter—In Feet.	Cyanide Solution—Fluid Ounces.	Sulphuric Acid—Fluid Ounces.
6	5	2	1¼
10	10	12	7
12	8	9	5
16	12	28	16
20	14	47	26

> This table is based upon the cubical contents of the space inclosed by the tent, supposing that the lower part of the tent rests upon the ground. No harm will result to the tree if twice the quantity that I have recommended be used, but of course, for the sake of economy, it will be desirable to use only such quantity of each ingredient as will be necessary for destroying the scale insects infesting the tree to be treated with this gas. The sulphuric acid should have a density of 65° when tested with an acid hydrometer; should its density be lower than this, use an extra ounce of the acid for every 5° of density below 65°.

According to Mr. Morse's experiments published in the bulletin, however, it has been proved that the injury to foliage was caused by ammonia, which, especially through the direct influence of sunshine, is evolved from the gas confined in the tent, and Mr. M. suggests, therefore, instead of passing the gas through liquid sulphuric acid, to construct a drier large enough to have it filled with a quantity of pumice stone saturated with sulphuric acid. To test this idea on a larger scale, and to also test the practical workings of the Culver tent, I obtained the consent of the commission to have an apparatus made. From Mr. J. P. Culver, of Los Angeles, I obtained permission to make use of his drawings and plans and had a tent constructed according to his idea, with slight modifications, except to size of timbers, frame, etc., which were reduced one half fully, making the whole apparatus so that it could be drawn along on level ground by one horse. The frame and sled on which the tent rests are 5½x12 feet, and are made of Oregon pine with runners of oak.

The tent proper consists of two even halves swung on heavy hinges fastened to the mast, and the frame on which the cloth is fastened is made of 2×2-inch ash. The curved part of the frame or arch is made of 1×2-inch lapping, and bolted together. Where the two frames meet to close the tent a strip of heavy felting is nailed on it. The tent cloth is made of heavy, fine-woven drill, oiled with linseed oil, and is tacked on the edge of the frame. The mast on which the heavy iron hinges are fastened is made of a 4×4, but it would be advisable to have this a little heavier, or have it banded with iron. On the top two iron rods with thumb screws and thread in the middle are held in iron hooks. These rods are an essential support for the two wings of the tent when they are swung on the hinges. When a tree is to be treated the frame is drawn closely up to the tree, the mast on line with center of the tree, and the wings are closed. The parts are kept tight together by means of a rope passing through screw-eyes placed alternately on both frames, thus lacing them together after the manner of a shoe. When being drawn from tree to tree the wings of the tent are swung back, the lower end of the frame resting on a scantling, and fastened by means of bolts working in a slot, the frame being braced by ropes, one on each side. In windy weather some difficulty is experienced in handling this, as all other tents. The cloth falls on the ground and laps sufficiently to cover both ends where the two frames meet. On the whole, I believe it the best appliance for covering small and middle-sized trees, but I should not recommend it for trees larger than twelve to fourteen feet. (The frame of the tent I operated with was twelve feet high.) The Titus frame and tent were the ones used by Mr. Morse in his experiments.

THE TITUS FUMIGATOR.

This apparatus was devised by Mr. L. H. Titus, of San Gabriel, and is especially designed for operating on tall trees. It consists of four corner posts, made by bolting together two boards in such a manner that they form a right angle with each other; at the upper ends these posts are connected by cross-pieces, formed of boards bolted together like those forming the corner posts. Two of these cross-pieces are longer than the other two, and are placed on opposite sides of the frame; they are connected near the middle by two cross-pieces, between which is placed the roller upon which the tent is to be wound when being drawn off the tree. These various cross-pieces are braced.

The lower end of each of the rear corner posts is rigidly attached to an axle, on the outer end of which a light wheel is placed, while the inner end is connected with the corner post by an oblique brace. The lower end of each of the front corner posts is attached to the middle of an axle, having a light wheel at each end; the post is attached to the axle by an iron bolt, which permits the wheels to be at the same moment turned, the one forward and the other backward, like the forward wheels of a wagon or buggy. By means of this arrangement the fumigator can be turned about in a circle. The front and rear corner posts on each side of the fumigator are connected with each other by a cross-piece extending from one to the other, and strengthened by braces which extend obliquely from the cross-piece to the posts.

When this fumigator is in use, the front and rear cross-pieces, extending from the posts on the other side to those on the other, are removed, so as to permit the frame to pass either forward or backward over the trees.

The top of the tent is attached by three ropes to the roller, while to the lower edge of the tent are attached four ropes, placed at equal distances from each other; each of these ropes passes through a pulley attached to a frame near each upper corner, and the end of the rope is attached to the lower edge of the tent, at the place where the opposite end of the same rope is attached. For winding the tent upon a roller an endless rope is used; this passes around a grooved wheel at one end of the roller, and is carried through a pulley near the upper end of one of the rear corner posts; from this point it passes to and around a grooved wheel fastened to the cross-piece near the lower end of this post, and this grooved wheel is operated by a crank.

In taking a tent off of a tree, each of the corner ropes is pulled through its pulley, drawing the bottom of the tent upward, thus turning the tent inside out. After the tent has been drawn up as far as possible, the crank operating the grooved wheel that works the endless rope is turned, winding the tent upon the roller until it has been entirely removed from the tree. The fumigator is thus drawn forward until the tent is brought directly over the second tree, when the ropes attached to the lower edge of the tent are loosened, permitting the tent to drop down over the tree, at the same time unwinding the tent from the roller, and continuing this until the tent rests upon the tree.

THE GENERATOR.

The generator consists of castings and pipes, and was made by Geo. Cumming & Co., but was devised by Mr. Morse.

It consists first of an earthenware jar, which is held firmly by means of a frame, the joint being made tight by means of heavy felting. Through this board two pipes pass connected with receivers, one for the cyanide and one for the acid. When by pouring the acid on the cyanide the gas is given out, it passes onward through a 4-inch pipe which connects with the drier, a large iron* casting 6x18 inches, which is filled with pumice stone moistened with sulphuric acid, and is made so that it can be revolved for the purpose of bringing all particles of the pumice stone in contact with the acid. Through this drier the gas passes onward into pipes which lead into the tent.

Parallel with the pipe, passing toward the drier and connected by an elbow, is a galvanized iron pipe, on top of which is fastened a Cumming fan blower. The blower can be made to act two ways by means of a circular valve, this being moved by a rod. The blower blows forward through the pipe, which meets the gas which has passed through the drier, driving it into the tent. The object of the valve is to prevent the escape of any gas which has not passed through the drier and which might contain ammonia. The suction pipe of the blower passes directly into the tent, and consequently when the gas is in the tent, it is kept circulated when the blower is at work.

The experiments on orange trees ranging from eight to twelve feet high were made during the months of June and July, of 1888, near San Mateo, at the grounds of H. Barroilhet, Esq., who kindly furnished me with assistance in transporting the machinery and putting it up; also in helping to operate the apparatus. Owing to the trees being very near together, it was impossible to use horse power in moving the tent, and this made our progress very slow and tedious. Strong winds interfered also very seriously, tending to make the tent leak. The tests were made during all kinds of weather, from 60° F. to 85° F., calm and windy; and when the drier was well saturated with acid no harm was done to the trees; young fruit, even during a confinement of forty minutes during the noon hour, not being affected. On the other hand, when for the lack of sulphuric acid the drier was not sufficiently charged, serious harm resulted, the foliage in a couple of days falling off. This was especially the case when the operation was done during the middle of the day, but bad effects also resulted when done in the evening as late as seven o'clock, at a temperature of 60°. The effect on the *Icerya*, which were present in immense quantities, was nearly the same when a tree was confined for twenty-five minutes, as when for forty-five minutes, only the bugs themselves and from 50 to 75 per cent of the eggs are killed. That the prevailing wind may have had a good deal to do with my failure of doing better at such times is possible, but I am satisfied, from general results, that when orchards have to be treated on a large scale, it will be found necessary to give two treatments for extermination, and I should recommend, in accordance with this view, that these two treatments be given at four weeks' intervals, which will give an opportunity for remaining eggs to be hatched.

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* The drier ought to be made of lead if expected to last long.

COST OF TREATMENT.

Placing cyanide of potassium at 50 cents a pound and acid at 8 cents, we have the solution of cyanide at a cost of 1 cent per ounce, and acid per ounce $\frac{9}{16}$ of a cent, making it about 27½ cents, for a twelve-foot high tree, for one treatment.

On level ground two men and one horse can handle the tent and treat two trees per hour, allowing twenty-five minutes for the dose to act and five minutes for moving and getting ready.

One horse	$0 50
One man	2 00
One man	1 50
	$4 00

Or an expense of 20 cents per tree.

If two apparatus are used they can be worked with the same force, making the expense but half, or 10 cents apiece when forty trees are being treated once, or for two treatments 20 cents each. To this add the cost of material and it would, for a twelve-foot high tree, be about half a dollar. Besides this there must still be added the price of labor of putting on proper bands. For this purpose sheepskin has been found to be the best; strips four inches wide.

It must, however, be remembered that bands must necessarily be placed on trees that are being sprayed and therefore must not be counted as an expense exclusively attending the gas treatment, being common to both spray and gas process.

GENERAL REMEDIES FOR SCALE INSECTS.

For Scale Insects on Deciduous Trees.

"The wide difference in the atmospheric conditions in the different parts of the State has proved, as might be expected, that different remedies will be found suitable to different localities. When comparing the efficacy of a wash used in one locality with that of another in another locality, we are apt to be misled. Only by trying the same remedy in different localities can definite conclusions be reached. As a general thing, the caustic remedies have been used with good success in the more cool and moist climates of the coast. When well applied, they must be considered among the best and most efficacious we have. On the other hand, they have been generally less successful in the interior of the State, where a dry atmosphere prevails for a longer time.

In using caustic washes, the following points must be especially taken into consideration:

1. Condition of trees.
2. Time of application.

1. Trees must be dormant; otherwise the first buds, especially when advanced, will be damaged.

2. A humid atmosphere, without being actually so as to cause water to run down the trees, is much more preferable than very dry weather; in fact, as was proved last season, actual damage has been done to trees when the wash has been applied during such weather, and the results in killing the scale have also been unsatisfactory under such circumstances.

While we still believe that the caustic, in the proportion given below, when used under precisely favorable conditions, is as sure and wholesome a remedy as we can apply to apples, pears, and plums, the simple whale oil and sal soda remedy, especially for peaches and cherries, has proved very efficacious; but great care must be exercised in applying it, as the oil is apt to separate, unless well stirred and the compound kept warm.

For Pernicious Scale (*Asphidiotus Perniciosus*).

For badly infested orchards I recommend: One and one fourth gallons of whale oil, twenty-five pounds of sal soda. Dissolve the sal soda in twenty-five gallons of water, and heat it to boiling. When boiling, pour the whale oil in. Apply the wash when cooled to 130° F. The whale oil forms a kind of emulsion, most of the oil remaining free. After allowing this dose to act for three or four weeks, apply caustic solutions in this proportion:

1 pound of concentrated lye (American), or	80 per cent.
⅘ of a pound of powdered caustic soda, or	98 per cent.
1 pound of powdered caustic soda, or	76 per cent.
1½ pounds of powdered caustic soda, or	63 per cent.

Any one of these to one half pound of commercial potash, at 52 per cent.

To be dissolved in six gallons of water.

MODE OF PREPARING WASHES.

The easiest way of preparing the alkali washes, especially the solid concentrated lye, is by suspending the material in a barrel of water, either putting it on a perforated piece of tin or colander. Being thus suspended, the diffusion is quite rapid, and the material will require but little looking after. By using hot or boiling water, the action, of course, is hastened very much. When dissolved thoroughly, each kind having been kept separately, they are mixed, and stirred well so that they become thoroughly mixed. The liquid should be strained through a fine sieve (brass) or a cloth, so that no clogging is possible when the wash passes through the nozzle.

The San José nozzle has been and is very generally used, but for lye washes, it is, in my opinion, inferior to the Imperial and the Cyclone. The latter has the advantage of throwing the stream better on the underside of branches and foliage. When a pump with two outlets is at work, the two kinds of nozzles may be used to advantage. One man may work principally on the upper part of the tree with the Imperial (because its spray being thrown straight, hits the more vertical branches squarely), while the other man will reach the lower more horizontal branches better with the Cyclone spray, carrying, as it does, either upward or downward.

A very good nozzle is that invented by John Crofton, and sold by H. P. Gregory, and Woodin & Little. It has the advantage of clearing itself by a turn of the bib. Its spray is similar to that of the Cyclone nozzle.

CAUSTICS, OBJECTS OF.

The object to be obtained by using the caustics after the sal soda and whale oil, is to saponify any oil that might have remained on the tree, and which would have a tendency to clog the pores of the bark. We believe this treatment will prove the most efficacious yet recommended.

The cost of whale oil is 30 cents a gallon, in fifty-gallon barrels; 35 cents, in cases. As to caustic, it must be remembered that the price will vary according to quality, and that the purest product is the cheapest. The green bank, 98 per cent, is considered the best and the least varying; next to this, American concentrated lye. Geo. F. Lewes and Menzies & Co. seem to be most reliable.

FOR A LIGHTLY INFESTED ORCHARD.

In the moist coast counties I would recommend the caustic in this proportion, for pears, apples, and plums, the trees to be perfectly dormant:

1 pound of solid concentrated lye (American), or	80 per cent.
⅘ of a pound of powdered caustic soda, or	98 per cent.
1 pound of powdered caustic soda, or	76 per cent.
1½ pounds of powdered caustic soda, or	63 per cent.

Any one of these to one half pound of commercial potash, at 52 per cent.

To be dissolved in four gallons of water; one fourth of a pound of whale-oil soap (80 per cent) to each gallon of mixture.

For peaches and cherries, and in the drier localities, whale oil and sal soda in this proportion:

One gallon of whale oil to twenty-five pounds of sal soda, twenty-five gallons of water. Prepare the same as above.

PREDACEOUS AND PARASITIC INSECTS.

The casual observer who passes over his trees, noting from time to time the appearance and disappearance of insects, does not know how important a role certain insects have upon others keeping them in check and sometimes almost exterminating them.

Among the insects most useful to man in checking and often apparently exterminating some of his insect foes, is the large family of *Coccinellidæ*, or ladybugs. These prey both in the larval and in the mature state. The various species of *Coccinella* and allied genera serve as natural checks on the innumerable *Aphideans*, or plant lice, which infest all our cultivated plants, from grains to fruit trees. The *Coccinellidæ* resemble each other much in appearance in the larval state, although some are hairy, some are smooth.

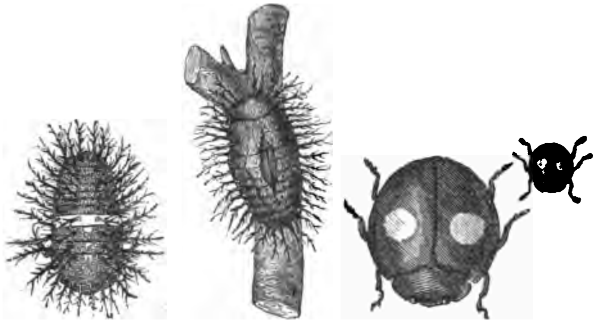


Fig. 9.

Figure 9, *Chilocorus bioulneris*, gives a good idea of these insects in their various stages. When the larva is ready to pupate it attaches itself to a leaf. The mature beetles vary much in size and color, the commonest being red or orange, with black spots. In distinction from the family of leaf beetles, *Chrysomellidæ*, of which the *Diabrotica* is a type, these beetles have only three joints in the toes, while the former have four. The red and orange-colored species seem to confine their attention chiefly to the *Aphideans*. The red-spotted black ones are mostly scale eaters. In California the *Chilocorus bioulneris* has at times proved itself quite valuable in this respect. And from South Africa comes lately the account of the appearance of a species named *Rodolia icerya*, which has proved very useful in preying on the terrible fluted scale.

The *Scymnus marginicollis* is a minute ashy-brown ladybug, which of late has been observed feeding on the eggs of the fluted scale. It is generally a carniverous feeder, as it has been observed by Mr. D. W. Coquillett feeding on plant lice, and by myself on various scale insects in different sections of the State.

PODABRUS BEETLES.

Often in grain fields, infested with aphis, there will appear black, sticky spots on the leaves of the grain, which denote the presence of these beetles. A little observation will show a slow, flying beetle, hovering about, or crawling on the blades. In shape it is almost linear, from one quarter to one third of an inch in length, with black wing covers, and yellow body and feathery antennæ. This beetle is a voracious feeder, and will destroy an immense number of aphis.

LACE-WINGED FLIES, OR GOLDEN EYES.

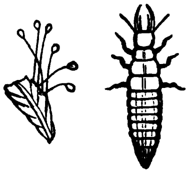


Fig. 10.

Of the few insects which have in California been observed preying on the fluted scale, is a species of lace-winged fly, or *Chrysopa*. On the whole, this group is very active in destroying some of our worst pests, including scales and woolly aphis. Figure No. 10 shows the appearance of the larvæ of the insect, and also the peculiar eggs mounted on stalks and often seen on leaves. The mature insect is distinguishable by its large, transparent, very soft, greenish body, large, lustrous eyes—these giving rise to the name of golden eye—and by its slow flight. In South Africa, a species of *Chrysopa* has been very abundant, preying upon *Icerya*.

SYRPHUS FLIES.

As a good check, especially on the troublesome plum aphis, several species of *Syrphus* flies are most important, and fruit growers should make themselves familiar with the appearance of these insects. I cannot do better than refer the reader to our last biennial report, in which an excellent account, taken from Hubbard's "Insects Injurious to the Orange," is printed in full.

SUPPLEMENTAL REPORT ON THE CONDITION OF VARIOUS FRUIT DISTRICTS.

POMONA.

My visit to this enterprising district, which rightly deserves its name, from the variety of fruits which are grown there successfully, was made last January. In company with two gentlemen well acquainted with this district I spent part of two days looking over this colony. The growth of deciduous trees, especially of apricots, compared very favorably with any other section of the State. A number of prune orchards exist also, which have made a good growth, but it was noticeable here, as in other portions of the State, that the prunes on high ground had already had their rest and were ready to start—in fact many showed green shoots at the tips of the leafless branches. To counteract this influence the matter of irrigation must be strictly attended to, and sufficient moisture should be preserved in the ground, either by careful cultivation, or, if nature does not provide sufficient naturally, irrigation then must be resorted to to fill the want. I do not mean hereby that the ground should be saturated, but sufficient moisture must be preserved in the ground so that continuous growth of the trees is kept up until the nights become sufficiently cool to arrest the growth of the trees. Moreover, I believe lands showing this tendency are better adapted to citrus fruits, in which case, of course, watering cannot be omitted. I failed to see this feature of prunes starting prematurely on deeper moisture, and likewise land more subject to frost. The growing of oranges and lemons is very successful on all the mesa lands, which are composed of a deep, sandy loam well adapted to irrigation, and I saw remarkable proofs of the yield of the latter fruit especially. Thus, Mr. C. E. White told me of the yield of nine bushels of lemons from a single tree. A variety, originally produced in Alameda County by Dr. E. Kimball, is cultivated here, and known as the Alameda seedling; it is considered a good variety.

The deciduous trees cultivated at Pomona comprise almost the whole list, including apples and pears. Among the persons who have devoted considerable attention to experimenting with fruit the Rev. Mr. Loop deserves special credit. Among a large number of apples Mr. Loop has an apple, which he received from the East under the name of the Polo, but according to Professor Budd, of Iowa, an authority on Russian fruits, this is the so called Winter Aport, of East Russia. This apple, Mr. Loop says, has proved better adapted to the climate than any other. It is a bright red colored, white-fleshed apple of medium size, and keeping here till April. It is also a good bearer, at least the tree was loaded at the time of my visit. On Mr. Loop's place are some of the largest and oldest plum trees in Los Angeles County, which had been planted by the early Spanish settlers. Among these is a tree producing a larger olive than the rest, and of the shape of the Mission, but larger. It also ripens two months earlier, and must therefore be considered a most valuable addition to our list of olives. Ten-year old olive trees on Mr. Loop's place have produced as many as thirty-five gallons of berries in the season. The black scale is proving troublesome, and needs here, as everywhere within the influence of the ocean, to be treated.

In some of the deciduous orchards the pernicious scale has not failed to make its appearance, but so far they have not been allowed to spread. The same can be said of the scale insect of the orange family, of which both the *Icerya* and the *Aspidiotus aurantii* have at various times been discovered, but so far have been prevented from spreading by heroic treatment of the trees. How long they can be kept at bay is, however, only a question of time. Unless something more effective is done in San Gabriel Valley to prevent the spread of these two pests, it will not take very long before they will invade the section.

SUCCESSFUL OLIVE GRAFTING.

Mr. C. E. White, who also has taken considerable interest in olives, has grafted over a number of Mission olives, two years ago, to Picholine. The grafting was ordinary top grafting, and was in nearly every case successful, the grafts being now large and in bearing. Most of the scions were not larger than a pencil, and the operation was done in April. I mention this, as it is the first successful grafting of the olive that I have seen performed out of doors in the State; and if, as this case seems to prove, it is a comparatively easy matter, it will be practiced largely in the future.

SAN JOAQUIN COUNTY.

STOCKTON AND IMMEDIATE VICINITY.

The City of Stockton contains a large number of fine shade, ornamental, and fruit trees, including oranges, which, at the time of my visit in November, were full of fruit. In two places, unfortunately, the *Icerya* has been brought on young orange trees from Los Angeles County. Steps were taken immediately to have the trees destroyed, and if the insect has not spread any farther the town may be saved from having its fine gardens infested. By accident I also found in one garden the *red* orange scale, but it seemed only confined to very few trees.

A couple of miles from town is the old nursery of Mr. W. B. West, formerly one of the largest nurseries on the coast. Mr. West has been experimenting considerably with many kinds of trees, and a visit to his place is very interesting. The soil there is a very stiff adobe, and better adapted to pears than anything else; although Mr. West has grown all kinds of trees, he regards the red spider as the most troublesome insect to contend with in the climate, and he has given up the growing of prunes for this reason. Mr. West has cultivated various French walnuts with fair success, although he regards the climate nearer the coast better adapted to it. The soil right here is hardly suited for it either. Of French varieties the Praeparturiens has done the best; the Serotina so far has not borne well. The Bijou has also fruited with him. This latter can hardly be recommended, as it contains but little kernel in proportion to the shell. F. Clows' nursery, farther out, was visited, and found in good condition.

Mr. Clows has been propagating the Bartlett and other varieties on the Japanese Sand pear, which is an exceedingly strong and vigorous stock.

BUDDING ENGLISH WALNUTS ON CALIFORNIA WALNUTS.

Budding of the walnut (*Juglans regia*) on the California walnut (*J. californica*) has, especially in the case of the Praeparturiens, proved successful.

The operation was done very carefully, and nearly all the wood taken out from the bud. Grafting of small trees had also taken very well. I believe this mode of grafting the English walnut on California stock deserves encouragement, as the trees are better adapted to the climate of the interior valley. It seems that the stock in this case governs the growth, and a more moderate and seasonable growth is produced than is the case ordinarily with the English walnut on its own root.

ORCHARDS ON THE CALAVERAS RIVER.

In company with Mr. W. H. Robinson, Quarantine Guardian, and Joe Hale, County Commissioner, I visited the different orchards in this district, especially in the so called Tom Day Settlement. The lands here are chiefly farmed by Italians. The soil is of sandy, sedimentary character, well adapted to many kinds of fruit. The peaches are cultivated chiefly, and do well. Carelessness has allowed the *A. perniciosus* to spread over much of the orchards, and many of them are in a very bad state. All the orchard owners have been notified to disinfect by Mr. Robinson, and I did all in my power to spur them to the necessity of action.

ISLANDS ALONG THE SAN JOAQUIN RIVER.

Passing over Roberts Island, we visited one of the largest and, at one time, one of the finest orchards of the section, the Williams & Bixler orchard. The soil there is generally of good character, except in spots where some alkali is found; some is a reddish alluvial, some a sandy loam. A variety of trees has been planted here, a couple of hundred acres in all—peaches, plums, pears, and cherries. Nearly all are badly infected with scale, and only such as the Black Tartarian cherry shows exemption and healthy growth. This place is also leased to Italians. We saw one of the lessees, who was preparing to do some spraying.

Going around the island we came to a number of smaller orchards lying on the San Joaquin River. The soil here is a deep loam, and the growth of peaches, plums, and pears has been very good. All orchards are affected some, but few, as that of Mr. Hale, being comparatively free. We called at several of the neighbors of Mr. Hale, and found them willing to do something toward exterminating. The general trouble has been that most of the orchards are rented out, and have been allowed to go too far.

COLUSA COUNTY.

In the month of December, a visit to Colusa City and vicinity was made. There are but few old orchards in this locality, and these are found principally on the Sacramento River. Old apple trees here attain large growth, and in some localities the codlin moth does not appear to have shown itself. During the last few years a large number of young orchards have been planted within a few miles of Colusa City. The greater portion of these consist of peaches, Bartlett pears, apricots, and French (petite) prunes. With the exception of some strips of land where alkali prevails, the growth of these young orchards has been excellent, especially of peaches, to which the climate seems well adapted. The people have also good faith in Bartlett pears. The young orchard of Mr. De Jarnatt, a mile and a half northwest from town, is an exceedingly well kept orchard that looks very promising. On the opposite side of the river, Mr. L. F. Moulton has a fine and well kept orchard principally of apricots and prunes; most of the trees are in their fourth year. Winter irrigation, by flooding from the river, is practiced largely. Some young trees have been badly infested with the pernicious scale, but we believe they have been treated since our visit; and with but little exertion on the part of the growers, this locality could be kept free from this pest. By accident I discovered a few small orange trees which were badly infested with *Icerya purchasi*. Although these insects had been here two seasons, I failed to discover that they had spread to any other trees, and prompt treatment of the trees has therefore prevented their further spread. The trees had been received from a Los Angeles nursery. This is the most northerly point I have found this pest.

In the gardens of Colusa I met with a number of orange trees, some quite full of almost ripe fruit (December 20), but many of the most exposed trees had been severely bitten by the first cold spell of the season. A drive some ten miles up the river brought us to the home ranch of Mr. L. F. Moulton. A large, thrifty looking nursery supplies Mr. Moulton's orchards and the neighborhood. In the garden of Mr. Moulton I saw several fine, healthy looking olive trees which had been full of fruit this season, and which, according to the foreman's statement, had been so for several years. They were a variety of Mission; no trace of black scale could be seen on them. A mile or so from the house, Mr. Moulton has a large, thrifty peach orchard in its third year. In all, this gentleman has some four hundred acres planted on the best of land which can be overflowed at will.

I regret exceedingly that want of time prevented me from going further in this large and productive county, which more than anything else needs population to develop its resources.

Leaving Colusa by stage for Marysville, we pass through the rich, agricultural county of Sutter, where the effect of the frost seemed to have been less severe. Sutter County is steadily enlarging its orchards, and the pack of the Sutter County Cannery has been very fine. The badly infested places near Yuba City have been thoroughly overhauled, and the active interest Mr. H. P. Stabler (who is serving the county gratuitously as Quarantine Guardian) is taking in the condition of orchards throughout the county is showing itself everywhere.

OROVILLE.

A couple of days were spent in this locality, to see the Butte County Citrus Fair, which did honors to the section—both for fine arrangement of the display and the handsome appearance of the fruit.

The seedlings—of which the exhibit chiefly consisted—are of a very high color, and already (in December) the bulk of them was in marketable condition. A few specimens of Washington Navel oranges, from the Thermalito, showed that this orange will here also be one of the most valuable to grow, especially on account of their being early. Several budded varieties were shown by Mr. Wilcox, the agent of the Southern Pacific Company, and the exhibit was indeed very interesting, as proving the adaptability of all the best budded varieties. We learned, however, that the seedling orange withstood the frost far better than any other variety.

THE OLIVE WITHOUT IRRIGATION.

The question whether the olive—which in all the foothills, when watered and uniformly free from the black scale of the Coast Range—could be grown, without irrigation, in the rolling granite and slate lands where a good rainfall prevails, has been a question in which I have been interested in determining for several years. From what I saw here, I feel confident that whenever a rainfall of twenty-five inches prevails on such land, where the stratum of rocks is vertical or permeable—so that the roots may penetrate freely into the crevices—by good cultivation there will be moisture enough left for the olive to do well, in spite of the long dry and hot season; which, compared with that of the Coast Range, is almost devoid of atmospheric moisture. I visited here the young orchard of Judge Gray, which, when considering the condition it was in last season, has done remarkably well. No irrigation had been given this year, and the trees had made a fine growth. The case, however, in which I was most interested in examining, and which, to me, proved quite conclusive, was that of an olive tree which, after some search, we succeeded in finding on a partly abandoned fruit farm, some six miles east of Oroville, in the hills. The tree had evidently not been cared for for many years, but had bravely held its own, looking as well as could be expected from a tree which had received no care and growing in very hard soil—part of the roots exposed to the weather. I found but little fruit on the tree, but that was sufficient to prove it a Mission. The people living near by had paid no attention to the tree, hence I was unable to learn anything with regard to its yield. In the town of Oroville several large olive trees exist; but, being in gardens, have been irrigated to some extent; and the example I have mentioned is the best I have come across. In connection with the matter of entire freedom from black scale in the foothills, I again call attention to the fact that the Oleander scale (*A. nerii*) will flourish here, and in several instances—as mentioned in previous reports—I have found trees badly infested, half of the fruit being affected to such an extent that it had not ripened. In every case the infection could be traced to oleander trees.

EL DORADO COUNTY.

Having been urgently requested to visit the section of the county of which Diamond Springs and Placerville are the centers, I spent several days of the latter part of the month of March in this vicinity.

In the neighborhood of Shingle Springs, the former terminus of the railroad, but few orchards exist, and none of any consequence are seen before reaching Mud Springs, or, as it is now called, El Dorado.

Many of the orchards and vineyards have been planted on the washed-out mining claims, where the soil is very shallow. The soil is granitic in its character mostly, and, when not washed out, of a red color. Its natural growth is live oak of several kinds, black oak (*Q. kellogii*), blue oak (*Q. douglasii*), and pine.

The orchards consist chiefly of peaches, apples, and pears. The peach has here suffered from a blight (this blight is not well understood yet, and needs investigation), similar to that found in other portions of the State, but the last two years have been less severe than formerly. The peaches in the vicinity are well thought of by shippers, and sell at fair prices. The Orange Cling and Roseville Cling are among the leading varieties. It had been thought that the orchards about here were badly infested with *Aspidiotus perniciosus*, but this proved a mistake, as I saw only some few trees affected, sufficient, however, to stock the place if not attended to. While here I was shown some black oak trees, which had been grafted with Spanish chestnuts, and had made a fair growth—as much as could be expected without cultivation.

The codlin moth is, in the people's estimation, the worst enemy, and many are despairing of any success of fighting it. No systematic effort has been made, however, to check it, and many of the orchards are badly neglected. This year the arsenic remedies will be tried.

VICINITY OF DIAMOND SPRINGS.

Like the former town, this is an old mining town which has fallen into decay, but through the energies of some few settlers, who have demonstrated fruit culture a success, the county is gradually gaining again. Owing to the codlin moth, many orchards have been grubbed out; yet the quality of the apples here is such that no effort should be spared to check it. It will doubtless always be a hard matter to make the growing of later apples, as they suffer especially from the several broods of moths, which in the dry and warm summer climate are very abundant. By means of thorough treatment, scraping of the bark, and spraying with Paris green, the earlier apples, such as Gravenstein, Alexander, and Astrachan, undoubtedly might be made a success. These varieties would, I think, find a ready market in the Northwestern Territories.

In and about Diamond Springs the pernicious scale has spread to a considerable extent. But few people have done anything to counteract its spread until very lately; however, a change for the better was noticeable, and by considerable exertion it may be prevented from spreading very far. One of the most energetic young fruit growers has accepted the position of Quarantine Guardian, and I believe will do all within his power to awaken people to the necessity of action. I found several persons spraying their trees with caustic soap solution.

The planting of peaches is receiving most attention, but a good many Bartlett pear trees have been set out lately, as the pear is better adapted to the moister land, where the peach is much affected by a gum disease. Nearly all orchards in this vicinity are irrigated, and in many of them red clover is cultivated among the trees—a practice, the benefit of which I question. This growth of course prevents cultivation. Experienced growers contend that on deeper land all kind of fruit trees can be grown without irrigation, and a few orchards seem to demonstrate this.

But few cherries are found here, but according to Mr. W. D. Carpenter, they do well on deep land, bearing well and early. The English walnut is found in some few places, and there are instances of certain trees bearing well—indicating that if the right variety was planted, they would do well and prove profitable. The orchards of the whole region are comparatively small, ranging from a few to twenty or thirty acres, and on the whole do not demonstrate the capabilities of the county. Some few miles from Diamond Springs to the southeast, lies the property of the El Dorado Fruit Company, which is a place worth seeing. The land here is virgin soil, chiefly loose granite varying in tint. In all some two hundred acres are under cultivation, the greater portion of which are in peaches. An orchard of French prunes grafted on peach has borne exceedingly well. This place is a fair representation of what can be done in this section with good management, and reflects credit upon everybody connected with it. The growth of the trees has been good and they appear perfectly healthy.

PLACERVILLE.

This old town is surrounded by orchards, which, as a general thing, are not well cared for. The peach trees which have been planted on the higher knolls are trained too high, and the trunks being unprotected are riddled with borers; in fact, the latter insect ruins probably two thirds of the young trees of all kinds set out, and until people learn that the first step after setting out young trees is the protection of the trunk in some way, either by shading by shakes on the southwest side or by whitewashing the trunk with something that will reflect the intense heat, this damage must always be expected. In town the *A. perniciosus* is well seated, and the ignorance of people of its bad tendency has allowed it to spread considerably. The codlin moth has discouraged the apple and pear growers, and of late but little has been done to check it. The arsenic spraying is objected to on account of the cultivation of clover for pasture in the orchard. The long distance to market has had a discouraging influence on the fruit growing, but no doubt the opening of the railroad to the place will mark an improvement. I met with but few fig trees in that portion of El Dorado County. From what I could learn and see of its growth its culture deserves encouragement. No doubt with the proper selection of drying varieties, such as the White Adriatic, it would be made profitable. The fig thrives without irrigation I am assured, and could therefore be grown over a much larger area and cheaper than other fruits. The facility for drying in this county is also good—a very essential help toward success.

VACA VALLEY.

During the month of January I again paid a visit to Vaca Valley and adjoining small valleys.

I found that throughout the central part of the valley the pernicious scale has been scattered badly, though the number of trees in any one place was generally but small. Most people were well aware of the danger, and had already taken vigorous hold, while some few were surprised to learn that they were harboring something dangerous. In the matter of remedies I found the recommendations of the Santa Rosa Convention and myself being followed largely. On the road Mr. F. B. McKevitt called my attention to an oak tree suffering badly from the attack of a scale insect which was very difficult to tell from *A. perniciosus*. A microscopic examination of it proved, however, that it was a genuine oak scale. I mention this fact, as it would, of course, be of importance to know if the pernicious scale lived on oak, and if this tree was not the original source whence this bad pest had spread. From this examination I must conclude that there is no connection between the two. The result from the use of strong caustic struck me as a general thing to be unfavorable, the trees in many cases having been burned on the limbs; this had occurred when the solution was used during dry weather. Although these seem to be the general results, a grower, who had given much attention to this matter, and had used caustic potash and soda of the same strength as his neighbors (according to bulletin of last year), has had no reason to regret his work, and on the contrary claims that the trees treated paid better than those trees not treated (which were healthy).

During my stay I visited the old Bassford place, which lies in a little protected nook in the west part of the valley. This place is among the first that send early cherries to the market, and has acquired quite a reputation in this respect. The oldest trees are showing signs of decay and are too close together (being but twelve feet apart) to continue healthy. A number of trees are on Mahaleb root, and have failed to bear for the last few years; they bore well until ten years old. The Mahaleb on its own roots thrives admirably, and here is the largest tree of the kind I have seen, having at least a spread of branches of fifty feet. The purple Guigne cherry, which is sent from here, was brought from Flushing, New York, originally.

There has been a large number of orchards planted in the valley between Vaca Valley and Suisun. Among the first and best kept here is that of Mrs. Buckingham, consisting largely of peaches, pears, and prunes. The scale is also found in the vicinity, but if well attended to might still be eradicated. Mr. Dickson has an especially fine prune orchard for its age.

ONTARIO.

During the month of February of this year I was enabled for the first time to visit this enterprising settlement, and in company with Mr. E. W. Collins, who is acting as Quarantine Guardian, spent a day looking over the orchards. The colony had, with many portions of Southern California, undergone a very severe windstorm, accompanied with cold, which had ruined much fruit, and in some sections had hurt the young lemon trees severely. The soil, which is chiefly a sandy loam, appears exceedingly well adapted to both the lemon and orange, and many very pretty young orchards heavily laden with fruit (indeed, too heavily for the good of the many trees), some only in the fourth year, could be seen. Among the finest lemon orchards is that of Dr. Chaffey, a brother of the original founder of this colony. The doctor has been experimenting a good deal with the curing of lemons, and claims to have reached good results with what might be termed the wet sand process. He buries the lemons in sandy soil, in trenches thirty inches wide, and twelve inches deep; the lemons are laid close together, and covered with sand; the water is turned on, and the lemons left for five and six weeks. We tasted several lemons cured in this way, which were remarkable for high color and richness in acid. The process has hardly been tried sufficiently to warrant full recommendation, however, and one objection to it seems to be that the fruit, on exposure to dry air, turns speedily very hard. The orchards on the whole are in excellent condition as regards freedom from insect pests; the soft orange scale is found in some places, as is also the black scale, but the latter gains but little headway. Appearance in a couple of places of the red orange scale has been noticed, but the pest has been promptly, and I believe successfully, exterminated. Deciduous trees develop very rapidly here, but are, like the evergreens, irrigated. It was interesting to see the result of an experiment which Mr. C. H. Dwinelle had made on his place, at the head of Euclid Avenue, at an elevation of some two thousand feet. Here we found quite a variety of fruit trees, including apricots, peaches, prunes, apples, and pears, which had grown without irrigation, and compared favorably with trees grown anywhere. The rainfall here, nearer the mountain, I understand, is a good deal more than at a lower elevation, and possibly some seepage from the hills above may help matters, but it nevertheless looks very encouraging. Olives likewise are doing well here, although none I believe have borne well yet. The colony is almost exclusively devoted to the growing of citrus trees.

MISCELLANEOUS.

Considerable attention has lately been drawn to the Myrabolan plum as a grafting stock. While visiting the old Briggs orchard on the Feather River, in Yuba County, my attention was called to a number of apricot trees which were still vigorous and healthy, although covered over with slickens eighteen inches to two feet deep. Around these were apricots on peach roots, and these were in a state of decay. The case was very striking, and well worth recording.

THE CHESTNUT IN SONOMA COUNTY.

Mr. N. Whittaker has on his place above Bennett Valley, in Sonoma County, several acres of Italian chestnuts, which have done remarkably well. The trees are now in their sixth year, many of them being sixteen to eighteen feet high, the trunk diameter of many of them averaging four inches. Although the growth on the richer and deeper soil is far better than on the shallow and clayey soils, the growth, on the whole, must be considered good, especially as they have received no irrigation. Quite a number of these trees are in bearing this year.

IMPORTED TREES.

Considerable attention has been paid to the importation of orange trees from abroad—both from Japan and Florida. It was ascertained this spring that at least two species of scale insects are often brought from Japan, and that at least two more are found on them quite frequently. One of the kinds most commonly seen is a species of *Lecanium*, or black scale, probably identical with our own. Another is identical with the red scale prevailing at San Gabriel and Marysville, and pictured in my report, Plate II. In view of this fact, and the knowledge that we have received our worst insect enemies from other countries, I have endeavored to have all imported lots showing the least trace of infection thoroughly disinfected. In every case where I have been able, I have examined the imported lots myself, and the Quarantine Guardian appointed for San Francisco has supervised the dipping, and no certificate has been issued before this has been done. In justice to the importers of these trees, I must say that they have all willingly and cheerfully submitted to the necessary disinfection, although the trees in almost every case have been exceptionally clean, and only the most thorough search would reveal any living scale. In this connection, it is proper to call attention to the necessity of most extreme caution in the importation of fruit and ornamental tree cuttings, etc., from abroad and from the Eastern States, and any one receiving anything suspicious is asked to communicate with me. In the matter of olive trees and cuttings from abroad, too much care cannot be exercised, as we are liable to receive from the Mediterranean region more than one pest yet strange to this coast, that might render olive culture unprofitable. In importing prunes, plums, and nectarines, no earth should be allowed to adhere to the roots, lest we might receive the larvæ of the *Curculio*, the pest of these fruits, which is rendering the culture of all the smooth fruits a failure east of the Rockies.

Recognizing the utter impossibility of reaching all the fruit districts which exist throughout this State, and only being able to visit a small portion of their constituents myself, I have, whenever feasible, tried to meet local societies, grangers, etc., and tried to encourage the formation of such. In almost every section where I have traveled, I have been cordially received by fruit growers, and nearly always have found them anxious to remedy evils. Indeed, within the last two years, with cheaper and more successful remedies, a spirit to combat all the insect pests has shown itself. Yet cases where considerable apathy exists are not wanting. What I have said here refers chiefly to the deciduous tree pests. As regards the insects infesting the evergreens, the case is not so flattering. From the very nature of the trees, the dense mats of foliage almost absolutely prevent total extermination by any wash. The cost of keeping trees clean is much greater than in the case of deciduous trees, and especially with regard to the much dreaded cottony cushion scale, which yields only to the most radical treatment. Partly discouraged from the very difficulty of fighting the insect, and partly tempted by the spirit of speculation so rife in many parts of the State, growers have given up the fight.

Very respectfully submitted.

W. G. KLEE,
Inspector of Fruit Pests.

San Francisco, July 2, 1888.

REPORT OF THE COMMISSIONER OF THE SECOND HORTICULTURAL DISTRICT.

To the honorable State Board of Horticulture:

GENTLEMEN: I herewith present a brief report from the Second, or Napa, Horticultural District. The fruit interest of this district has been steadily on the increase, more especially in those parts of the district not heretofore considered as a fruit-growing section. Lands are eagerly sought after by the newcomer that is adapted to fruit growing, and many young and thrifty orchards are being cultivated with care. The new and best varieties of fruits are sought out, with the view of raising the best, and looking to quality instead of quantity. The shipments East speak well for the season—the grape crop in Napa Valley is especially fine this season. The late rains extending so far into the growing season has been of vast benefit to all kinds of products,.as well as the fruit crop. The hay crop is extraordinary fine, as that is an indispensable necessity to all other crops, as feed is required for our working stock, without which our lands could not be well tilled. Every orchardist and farmer should lay in a good supply of good hay in due season—a barn well filled with a bountiful supply of provisions for his working stock will insure a good return for his labor. A large supply of feed denotes thrift and good results. By the increase of barnyard manure the land is recuperated, and crops are improved. Of course this is all old advice, but there is a great neglect on the part of fruit growers to save up manure, without which the soil of our orchards will soon become exhausted and the fine fruit will degenerate. Some of our rich and virgin soils have withstood the constant drain on its power to yield heavy crops year after year, but time will tell the effects of land that is neglected to be well manured from time to time. Trenches dug and filled with manure and dirt thrown on top is a good way to recuperate and make productive the orchard, the garden, and farm.

The present season is one that has been most favorable to the fruit growers of this district. There has been but little, if any, frost this season, and all our fruit crops, especially the peach, plum, and apricot, are yielding largely. It is encouraging to the fruit growers to see some enterprise in the way of building fruit driers on a large scale. There is a very extensive building for fruit drying now in process of erection at Napa City, situated immediately on the bank of Napa River, and also near the railroad depot, which gives them superior advantages for shipping or transporting green fruit from other sources. This is a step in the right direction that has long been needed. The vintage of Napa Valley is the best known crop for many years. There was some little scare in the upper part of the valley on account of the appearance of the army worm; but the damage was slight, and the pest soon disappeared, and the vintage of choice wine grapes will be very heavy this season. Much improvement in the way of cellar room and tankage has been made by the wine men of Napa, and producers are expecting a fair and remunerative price for their grapes. The small fruits, such as the blackberry, currant, gooseberry, and raspberry are yielding heavy crops in the Napa Valley. Much attention has been given of late to the cultivation of the English raspberry, which is a very delicious small fruit, and seems peculiarly adapted to the soil and climate of California, and is made very profitable, as it comes into market at a season when other fruits are green.

I have not the report of the amount of fruit sent East by carloads from the Napa District, but am informed that the number of carloads will far exceed any year before this. Our fruit stands are making a better display of choice fruit for table use than ever before, and what is most gratifying, it is all of home production, and not shipped, as formerly, from other sections of the State. We have about every variety of soil and climate in the Napa District, and by a little attention to the climatic influence, the intelligent fruit grower can best judge what varieties to plant to suit his locality. The codlin moth still abounds, and our apple crop is visibly affected by it, notwithstanding there is much improvement in the apple crop over the last few years. The grafting of new and hardier varieties into the old stock has done much toward eradicating this universal pest. I would recommend to the Board the establishing of an experimental fund, to be placed in the hands of experienced and practical orchardists, for the purpose of defraying the expense of some thorough test of remedies for the codlin moth, and other pests most injurious to our orchards. Other expenses of the Board, heretofore deemed necessary, could now be dispensed with, and the funds used in another direction, by placing it judiciously in the hands of practical men, who will experiment with the same to the advantage of the general public. I do not know of anything to add to the already vast amount of practical information to the fruit grower as published in the various reports issued from the office of the State Board of Horticulture. I have distributed personally a very large number of the reports of 1885, 1886, 1887, and the demand for them far exceeded the amount furnished by the Secretary of the Board, so much so that I had to repeat my demand for copies of the reports several times. They doubtless contain more practical information on all subjects pertaining to horticulture and horticultural interest than any work or report ever published in California, if not of any report issued in any of the States.

I received letters complimentary from some of the visiting members of the "American Horticultural Society," stating that they had not time to read our reports of 1885-86-87 until they had returned home, as most of their time while in California was taken up visiting the various cities, and banqueting and feasting among the fruit growers of our golden State. They were not aware what rapid advances had been made, and what attention had been bestowed on the subject of horticulture in California, until they found time to look over the proceedings of our Fruit Growers Conventions, and the reports of the State Board of Horticulture, published by the Board, with the debates on all questions, and plates illustrating the effects of the pests on our principal fruits; in fact, every subject connected with horticultural *pursuits* has been more fully published by this Board than that of any other State Board of Horticulture.

Respectfully submitted.

W. M. BOGGS.

NAPA CITY, December 4, 1887.

REPORT OF THE SAN JOAQUIN COUNTY HORTICULTURAL COMMISSION.

The fruit industry has received but little attention from the people of San Joaquin County, from the fact that the soil in the days of pioneer farming proved to be so well adapted to the growth of wheat and other cereals—which were more immediately profitable in former years than they are at present—that they preferred the dimes in sight to the dollars of the future. It is true a few small orchards, or scattering trees, were planted near a few of the houses, but they were grossly neglected, left unpruned and uncultivated until they became cumberers of the ground, eyesores to true horticulturists, and allowed to become breeding places for all sorts of fruit pests. Another great drawback existed in the fact that there was no home market, or even a cannery, to utilize the surplus production, and everything had to be shipped to San Francisco. There are, however, many old orchards in different portions of the county which show, by their vigor and productiveness, that fruit also can be successfully grown when a moderate degree of care and attention is given to its culture. People hereabouts are just waking up to the possibilities of their surroundings. All the nursery stock raised in the county is already sold, and local dealers are purchasing all they can obtain within a reasonable distance. Two millions additional could be sold this season if obtainable and known to be free from pests.

No other county in the State can boast such a brilliant prospective future as San Joaquin, or exhibit such a vast body of rich tillable land. It contains about nine hundred and fifty thousand acres, nearly all of which are fenced, cultivated, or improved, with the exception of perhaps one hundred and fifty thousand acres of tule, which will eventually be reclaimed when our increased population shall demand it. This immense body of eight hundred thousand acres is all tillable; there are no huge sterile hills or broad barren plains; hardly an alkali spot of any extent in the whole. Experienced fruit growers from other parts of the State, on seeing such immense areas of land so well adapted to fruit culture, express their wonder at the shortsighted policy of our land owners in using such valuable lands for grain raising; and some of the most prominent and enterprising, among whom may be instanced Hatch, Buck, and Reed, are buying these lands and converting them into nurseries and orchards. One great advantage will be enjoyed by the owners of such nurseries, they will be isolated and can easily be kept free from scale.

Four large rivers—the Mokelumne, Calaveras, Stanislaus, and San Joaquin—with their affluents, traverse our county through its entire length and breadth, thus constituting it the best watered territory in the State. In addition to our natural facilities and advantages, three large ditches, to be used principally for irrigating purposes, are already located and surveyed, and others projected: First, Weller's scheme for bringing in the upper waters of the Mokelumne, which will take time to complete; second, the Lawrence & Byrd ditch, which will be pushed to immediate completion now that a compromise has been effected with the obstructionists; third, the Stanislaus consolidated system recently inaugurated by Shippee and his coadjutors.

On the banks of these streams can be found thousands of acres of fertile alluvial soil suitable to the growth of the peach, apricot, plum, and cherry, also lower and moister land for the blackberry, raspberry, and strawberry. On higher and drier localities the almond, fig, pear, olive, and grape thrive abundantly without irrigation. In fact, there are but few parts of the county where the grape, almond, or olive would be bettered by irrigation. Peaches on the borders of the rivers are superlatively good; pears can be grown almost anywhere, and almonds bear remarkable crops without water. In the foothills grapes and olives bear abundantly where peaches cannot be grown without irrigation. On the Calaveras can be found thousands of acres of the best peach and apricot land in the State, awaiting the advent of enterprising fruit culturists. Plenty of cheap land can be found in the eastern part of the county with a red, gravelly soil, and a climate admirably fitted for the raisin grape; and this eastern belt is also suitable for the orange, if water can be had. These and the sandy loams of the southeastern section are the only lands that suffer for water. The western portion, including the heavy rich soils around Stockton, have proved themselves preëminently adapted to the growth of table grapes; possessing size, flavor, and good keeping qualities; for many years they have been shipped to the East and San Francisco, where they find a ready market. As no irrigation is practiced, or indeed, needed; the cost of working a vineyard in this vicinity is not so great as upon irrigated lands. Walnuts also find great favor among fruit growers; French seedlings have proved the best stock for grafting, though a few are experimenting with the California seedling, but the latter is declared to be difficult to transplant.

A recent inspection of numerous orchards, particularly those operated by citizens of foreign birth, show a reckless disregard of the requirements of successful culture, and a great want of knowledge and skill upon their part. They almost invariably grow cabbages, potatoes, onions, strawberries, etc., between the trees, and the necessity for irrigating a succession of these green crops—for they never allow the ground to lie idle—ruins the trees and injures the quality of the fruit. Their system of high pruning leaves the trunk exposed and invites the attack of borers, which soon destroy the trees. Fruit pests and scale insects in their worst forms and greatest variety infest nearly every section of the county, but energetic and persistent efforts are now making to rid the orchards of them, with strong hopes of ultimate success. My limitation as to space prevents me from dwelling upon this part of the theme, and I leave its further discussion to the State Inspector.

Before closing this report I would have liked, if it had been possible, to furnish the statistics of the shipments of fruit during the past season to San Francisco and the East, but time does not permit, nor can I now find the parties in possession of the figures. It may not be amiss, however, to state the plain, unvarnished fact, that Stockton, at the present time, is the very best location in the State for another cannery. It possesses a vast tributary territory outside of San Joaquin County, abundant fruit, plentiful labor, and unsurpassed facilities for transportation, comprising a short and cheap water route from the city front to San Francisco and the sea, a railroad at her doorstep, and additional competition assured in the near future.

Respectfully submitted.

W. H. ROBINSON, Secretary.

STOCKTON, December 21, 1887.

SECRETARY'S PORTFOLIO.

REMEDIES FOR THE DESTRUCTION OF INSECT PESTS.

I append hereto a compilation of many remedies in use, in this State, and suggestions thereto, compiled from reports.—[Secretary.]

COTTONY CUSHION SCALE (On Citrus Trees).

Recommended by Professor D. W. COQUILLETT, Los Angeles.

While the spraying of trees for the destruction of scale insects has not proved as satisfactory as could be wished, yet when properly done, and an effective wash has been used, it has had the effect of greatly lessening the number of these pests upon the trees thus sprayed; and while there is every reason for believing that the gas treatment will in the main supersede spraying, yet there will always be cases where it will be desirable to use a wash of some kind, such as upon plants or vines trained against a wall, or otherwise so situated that it would be impossible to cover them with a tent prior to fumigating them.

One of the best washes I have used for the destruction of scale insects consists of caustic soda, rosin and water, in the following proportions: Caustic soda, one pound; rosin, ten pounds; water, to make forty gallons.

The caustic soda is first dissolved by boiling in one and a half gallons of water, and when dissolved one half the solution is taken out and the rosin added to that remaining in the kettle. If this precaution is not taken, and the rosin is added to the whole of the soda solution, the latter is very liable to "boil over." After all of the rosin is dissolved add slowly the balance of the soda solution, and boil until the mixture will assimilate with water; this can be ascertained by occasionally dipping out a small quantity of the mixture and adding water to it. When properly cooked it will assimilate with water, like milk, but if it has not been boiled sufficiently it will form a ropy mass in the bottom of the vessel. During the boiling process the solution should be frequently stirred, and if it shows signs of boiling over a small quantity of water should be added, but not too much, or the cooking of the mixture will be delayed. While the mixture is boiling a foam will be formed upon its surface, usually equaling in height the depth of the mixture in the vessel, being composed of very small bubbles. On one occasion, when I was superintending the boiling of some of this mixture, the latter did not form such a foam upon its surface, but in its stead produced very large bubbles; this doubtless resulted from the fact that the mixture did not contain a sufficient quantity of the caustic soda solution to properly saponify the rosin; accordingly I added more of the soda solution, and in a short time the mixture produced the usual foam in small bubbles upon its surface.

When sufficiently cooked that it will assimilate with water, like milk, which it resembles, it should be measured and poured into a barrel or other vessel, and sufficient water added to make forty gallons; the water should be added very slowly, the mixture in the meantime being thoroughly stirred.

The use of the caustic soda is simply to reduce the rosin to a condition which will admit of its being diluted with water, and it does not, therefore, act as an insecticide, its caustic property having been largely, or wholly, neutralized by the rosin. This wash leaves a sticky residue upon the leaves, giving them the appearance of having been varnished; but in the course of a few days this dries up and is blown off of the leaves, leaving the latter in a clean, healthy condition.

I have used this wash upon orange trees, and have seen it used on other trees, also upon rose bushes, and in neither instance were either the leaves or fruit injured by it, while a large percentage of the *Icerya* were destroyed. It has the property in an eminent degree of saturating the egg-masses, and I have seen numerous instances where these had been saturated and the eggs killed, while females to which they were attached escaped unharmed, and excreted new egg-masses upon the old ones, the new ones being very noticeable by their purer white color. I have never used this wash upon the red scale, but reliable parties who have done so inform me that it proves fatal to a large percentage of these scales.

One thing greatly in favor of this wash is its remarkable cheapness; the materials of which it is composed can be purchased at such a rate that each gallon of the wash will cost only about one half of a cent.

[For gas remedy see essay in proceedings of Santa Barbara Convention.]

BURLAP BANDS.

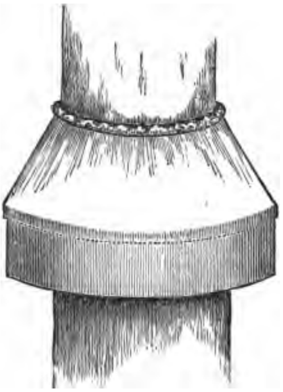
Hon. L. J. Rose, of Los Angeles, in a recent speech said:

> I have learned a habit of this scale bug which is never varied from, and that is, it always goes up and never down.
>
> This is valuable knowledge, for we have only to guard for one direction. It may fall off the tree, and they do in thousands, and many will hide and live for a time in the ground, but in the end they find the trunk of the tree and go up again. My cure would be to trim the tree, stripping it of all foliage and small branches, leaving only some of the larger branches, and well cut back at that, then to thoroughly wash the trunk and branches that are left to form another top, with sal soda dissolved in warm water; in fact, care must be taken that no egg or bug escapes, for in this thorough washing success lies, and immediately after washing and before any bug can crawl up, an inverted cone must be tied around the trunk of the tree, so that as they crawl out of the ground up the trunk, they crawl under this cone-shaped bandage, and when they come to the end, they will stop, for their instinct of never going back, answers here a good purpose. As they accumulate they will have to be killed, and if this is carefully attended to for a time, there will be no more in a short time, for they can only live by sucking the sap of the tree. It is easily seen that this is a radical cure if the work is thoroughly done, and if the orchard is not too large it can be done with a comparatively small outlay, except time.
>
> To make these cones various expedients will suggest themselves. Doctor Conger, of Pasadena, says that he can make them by taking old, worn out barley sacks (burlap) and wrapping it around the tree, tying with a fencing rope around the lower portion, then stripping the upper part over this tie, and pulling it out so the lower edge will not touch the tree, say by at least half an inch or more. This will be a convenient material to press against, thus killing the bug, when the edge can be again adjusted by shaping it out away from the trunk. A cone can also be made by taking tarred paper and cutting it in such a way that, when tied, the lower part will stand away from the tree. In that case cotton wool would have to be used to fill up the inequalities of the tree, for there are generally valleys or flute-like gutters in large orange trunks.

A TIN PROTECTOR.

Professor J. A. Lintner, State Entomologist of the State of New York, in his report for 1885, recommends this "tin protector," to prevent the ascent of the canker worm moth. This protector is simple and cheap, and should be tried on citrus trees, to prevent the ascent of the cottony cushion scale. —[Secretary.]

Take a strip of tin, four inches wide, of sufficient length when encircling the tree to leave a space of about six inches. The upper edge of the tin is bent over so as to receive beneath it a piece of muslin as long as the tin, and eight inches wide, to be held in place by pounding down the tin. The ends of the tin are bent in opposite directions, so that they can be



The suspended Tin-band Tree Protector for preventing the ascent of insects.

hooked together. Placing this around the tree with the cloth upward, the cloth is to be firmly bound to the tree by a strong cord. This method is shown in the accompanying illustration. In the above method, the insects, which will collect in large numbers below the obstruction, may be easily killed by brushing them with kerosene oil, without injury to the tree, unless an excessive quantity (a very little is needed) should be used.

SULPHIDE WHALE-OIL SOAP WASH.

Recommended by Professor E. W. HILGARD, State University, Berkeley.

The "whale-oil and sulphur" wash has for some time past enjoyed a good reputation as an insecticide, impaired only by failures due to varying material used. Its effects have, however, been found too weak and transient for many of the hardier pests, and its effects have been strengthened by lye added to the wash. It has been noted at the University that the effects were much enhanced when the wash was boiled after adding the lye, the chemical effect being in that case the formation of sodium sulphide, which acts much more energetically than the sulphur undissolved. To enhance the effect, I prescribed that a certain proportion of lye and sulphur should be boiled together before being added to the soap, the proportion used being three pounds of American concentrated lye boiled with six pounds of sulphur, and then added to a solution of thirty pounds of "Arctic" whale-oil soap, containing twenty per cent of water, to one hundred and fifty gallons of water. This wash worked very well when made up on the spot, and proved effectual against all the kinds of scale found on the University grounds, save the hard, armored individuals.

It was found, however, that when the ingredients were thus prepared and intermixed with a small proportion of water only, for transportation, the soap and the sulphide solution would separate from each other, and unless used subsequently as a whole, successive portions taken from a can would vary in composition, and be either too strong or too weak.

Experiments were, therefore, made to ascertain what proportion of the ingredients must be used to form a mass that would remain solid and uniform during transportation, and after numerous trials the following proportion was found to give the most satisfactory results:

Water	41 parts.
Whale-oil soap (20 water)	45 parts.
Concentrated lye	2.5 parts.
Sulphur	2.5 parts.

The sulphur is first dissolved in the lye by boiling with from four to six quarts of the water, and the whole, with the rest of the water (needed to bring the whole up to about fifty per cent of moisture), is then mixed with the soap. The above amount in pounds would make about two hundred and twenty-five gallons of wash.

The preparation thus made is soft enough to be easily dissolved in water, and remains perfectly uniform under the shaking of transportation. At the same time it is much more effectual than the old mixture containing only undissolved sulphur, and does not affect the leaves, unless while exceedingly tender, in spring. For citrus and other evergreen trees with leathery leaves it may be still farther strengthened by the addition of say a pound of lye per one hundred gallons of wash, after it has been made ready for use in the spray pump.

Recommended by Mr. ALBERT KOEBELE.

One pound of caustic soda is dissolved in one and one half gallons of water; then two pounds of rosin and one pound of tallow are dissolved in one quart of the lye. After the rosin is all well dissolved by moderate heat, the lye is added slowly while cooking under continued stirring; the mixture, if good, will become dark brown and thick. Should it become whitish and flocky (this is caused by too much and too strong lye), water should be added, and it will become right again. This will make twenty-two pints of soap, for water should be added to make that amount, after the lye is in, at a cost of eleven cents, excluding labor and fuel in preparing it, which amounts to but little, and will be sufficient for forty-four gallons of wash sprayed well.

For the Black Scale on Olive Trees.

Recommended by Hon. ELLWOOD COOPER.

Five gallons best kerosene oil, 150° test; one and a fourth pounds good common soap, or one bar and a half of soap usually sold as pound packages; two and a half galllons of water. This makes the emulsion. When using, dilute six and one half (to seven) gallons of water for each gallon of oil, and to this mixture add two and a half pounds of good home-made soap dissolved in boiling water. All this mixing is done with hot water, and is applied at a temperature of 140° F.

For flowering shrubs or garden plants, I would recommend sulphur and lime. Formula: Two pounds sulphur, one pound lime, two gallons water; boil one hour. Dilute one gallon of the mixture with three gallons of water, or more water, according to the strength of the plant.

For the San José Scale.

Recommended by Mr. SOL. RUNYON.

WINTER WASH.

Ingredients for one hundred gallons of solution: Two gallons of fish oil; ten pounds of caustic soda, 98 per cent (dissolved in five gallons of water); five pounds of bluestone.

First—Dissolve the soda and bluestone together in five gallons of water. When dissolved, add the fish oil, and stir until it reaches a boiling point; it can then be reduced with water, and applied, but better results are obtained where it is set aside and not used until the following day; it must be applied warm.

SUMMER WASH.

Ingredients for one barrel of fifty (measure) gallons. Weight, about four hundred and fifty to five hundred pounds.

Ten pounds caustic soda, 98 per cent; ten pounds potash; forty pounds tallow; forty pounds rosin.

First—Dissolve the potash and soda in ten gallons of water. When dissolved, place the whole amount in the barrel to be used.

Second—Dissolve the tallow and rosin together. When dissolved, add the same to the potash and soda in the barrel, and stir well for five minutes or so. Leave standing for about two hours; then fill up with water, stirring well as every bucket of water goes in. Use the following day, one pound to the gallon of water. Apply warm.

Receipt for Making Fish-Oil Soap for Summer Wash.

Ingredients for one barrel of fifty gallons:

Potash	14 pounds.
Caustic soda, 98 per cent	8 pounds.
Lime, unslacked	5 pounds.
Fish oil, polar or seal	10 pounds.

First dissolve the soda and potash by placing them together in twelve gallons of water. Second, slack the lime in the barrel to be used, in two gallons of water, then add the fish oil to the lime and stir well until the lime and the oil have turned to a thick butter; then add the soda and potash, water boiling hot, and stir well with a dasher for five minutes or more, then leave standing four or six hours; at the end of four or six hours fill up with cold water; do not pour in all the water at once, but about two buckets at a time. Stir well as the first two buckets go in, to prevent lumps. Use the following day. Apply cold, one pound to the gallon of water. In dissolving it do not boil; but weigh the amount to be used, place in a barrel, and on top of it pour hot water, about one bucket to every hundred pounds. After pouring in the hot water stir lively with a dasher until it is entirely dissolved, then reduce, with cold water, sufficiently thin enough to pass through the strainer; then place in the tank and fill up with water, stir well, and it is ready for use.

Salt and Lime Remedy.

Recommended by Mr. I. H. Thomas.

Twenty-five pounds of lime (unslacked); twenty pounds of sulphur; fifteen pounds of salt; sixty gallons of water.

To mix the above, take ten pounds of lime, twenty pounds of sulphur, and twenty gallons of water. Boil until the sulphur is thoroughly dissolved. Take the remainder—fifteen pounds of lime and fifteen pounds of salt—slack, and add enough of water to make the whole sixty gallons. Strain and spray on the trees milk-warm or warmer. This can be applied when the foliage is off the tree, and will have no injurious effect on the fruit buds or tree whatever.

Recommended by Mr. A. T. Covell.

Fifty pounds of unslacked lime; twenty pounds of French sulphur; fifteen pounds of salt.

Prepared as follows: Place ten pounds of lime and twenty pounds of sulphur in a heater with twenty gallons of soft water. Boil for half an hour or more, until both lime and sulphur are dissolved. The sulphur must be thoroughly dissolved and mixed with the lime; the mixture will then be of an amber color. Next place in a cask or box forty pounds of good lime and pour upon it enough soft hot water to thoroughly slacken the lime and keep it in a liquid form. After the lime is thoroughly slacked, add fifteen pounds of common stock salt while the material is hot. When the salt is well dissolved mix the two lots together, with sufficient water to make sixty gallons of spraying material, which will then be a thin whitewash. The material should be strained after being thoroughly mixed—a good piece of burlap answering well for the purpose. Apply the mixture with a spray pump, using a rubber plate in the nozzle instead of the brass plate.

RED SCALE ON ORANGE TREES.

Flour Paste Remedy.

The following is the best method of making the paste: Use none but the *best* flour. Calculate one pound of flour to three gallons of water; *sift the flour.* Mix with enough water to make as stiff a paste or dough as possible, and yet have *all* the flour *wet.* Let stand twelve hours or more; then add enough cold water to make a thin paste. Boil the remaining water, and into it slowly pour through a sieve this thin paste, stirring the boiling mixture constantly. It is then ready to use when sufficiently cooled. Sifting the flour has much to do with the non-lumpiness of the paste. For heating the water and making the paste, make an oblong box of one and one fourth by eighteen inch plank, six feet long, making the bottom and ends of sheet iron. Place this box on a little furnace made of stones and mud mortar. Upon two sticks laid on the top of this box (a soap box without top or bottom), with bottom of wire screening, such as is used on screen doors, and then through this box is poured the cold paste into the well stirred boiling water.

OTHER REMEDIES.

For Aphis on Rose Bushes.

Spray with strong tobacco water, but must be washed off in about fifteen minutes after being applied, with cold water.

For Black Smut on Roses.

Colonel Mark L. McDonald recommends equal parts of pulverized sulphur and air-slacked lime, dusted on the foliage.

SAN JOSÉ SCALE.

Recommended by W. G. Klee, State Inspector of Fruit Pests.

*Winter Wash.**

I recommend two formulas of this kind:

1 ℔. of solid concentrated American lye, or	80 per cent.	Any one of these to 1 ℔. of commercial potash, 52 per cent.
⅘ ℔. of powdered caustic soda, or	98 per cent.	
1 ℔. of powdered caustic soda, or	76 per cent.	
1¼ ℔s. of powdered caustic soda, or	63 per cent.	

To be dissolved in 2½ gallons of water.

*Another Formula.**

1 ℔. of solid concentrated lye (American), or	80 per cent.	Any one of these to ½ ℔. of commercial potash, at 52 per ct.
⅘ ℔. of powdered caustic soda, or	98 per cent.	
1 ℔. of powdered caustic soda, or	76 per cent.	
1¼ ℔s. of powdered caustic soda, or	63 per cent.	

To be dissolved in 2 gallons of water.

Summer Washes.

Solutions are applied with best result when the majority of the insects are hatched, and persons should watch for this time; the first brood of the San José scale appears generally when the cherries are turning color.

As a general useful wash the sulphide of soda or sulphide of potash, with whale oil, has proved very satisfactory.

1½ pounds sulphur.
1 pound of concentrated lye, or powdered caustic soda, ⅘ pound, or caustic potash, 1 pound.
14 pounds best whale-oil soap (80 per cent soap).
55 gallons of water.

Dissolve the lye in one gallon of water, and boil the sulphur until dissolved. Dissolve the soap in the water; mix the two, and boil them a short time; use at 130° F. in vessel.

This wash is useful not alone against young scale, but against the scab disease of pears and apples; also against leaf-eating insects, as saw-fly larvæ and pear-slug.

Mode of Preparing Washes.

The easiest way to prepare the alkali washes, especially the solid concentrated lye, is by suspending the material in a barrel of water, either putting it on a perforated piece of tin or into a sack. Being thus suspended, the diffusion is quite rapid, and the material will require but little looking after. By using hot or boiling water the action of course is hastened. The liquid should be strained through a fine sieve (brass) or a cloth, so that no clogging is possible when the wash passes through the nozzle.

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*The strength given in both formulas should not be used on any trees after the buds have commenced to swell sensibly, and in almost all sections, except in very late ones, the spraying should be finished by the end of February.

Badly infested trees, when the scales are layers thick, may need two treatments, with an interval of ten days.

COTTONY CUSHION SCALE.

On Deciduous Trees.

Such as locusts, etc.

Use one fourth of a pound of concentrated lye, one fourth of a pound of whale-oil soap, to one gallon of water.

On Evergreens.

The summer wash, I recommended last summer, is useful, and will not hurt healthy foliage:

Dissolve thirty pounds whale-oil soap (80 per cent soap), in sixty gallons of water, by heating the two together thoroughly. Boil three pounds of lye (American concentrated lye) with six pounds of sulphur, and a couple of gallons of water. When thoroughly dissolved, it is a dark brown liquid (chemically, sulphide of soda). Mix the two, the soap and the sulphide of soda, well, and allow them to boil for about half an hour, then add about ninety gallons of water to the mixture, and it is ready for use. Apply it warm at about 130° F. Used warm its effect is better, and less material is required than when cold.

Rosin Solution.

Four pounds of rosin; three pounds of sal soda; water to make thirty-six pints. Dissolve the sal soda in a few pints of water; when thoroughly dissolved add the rosin. Heat until dissolved, and add water finally. Use two quarts of solution to the gallon of water. Use at a temperature of about 100° F.

Rosin and Tallow.

Sixty pounds of rosin; sixty pounds of tallow; ten pounds of potash; dissolved in ten gallons of water; ten pounds of caustic soda (Greenbank, 98 per cent). Dissolve the rosin and tallow; when dissolved, add caustic water slowly. After mixture is made, add ten gallons of water. Use one gallon of mixture to five gallons of water.

Kerosene Emulsion.

Kerosene, 2 gallons, 67 per cent.
$\left.\begin{array}{l}\text{Common, or whale-oil soap, } \tfrac{1}{2} \text{ lb.}\\ \text{Water, 1 gallon.}\end{array}\right\} = 33 \text{ per cent.}$

Heat the solution of soap, and add it boiling hot to the kerosene. Churn the mixture by means of a force pump and spray nozzle for five or ten minutes. The emulsion, if perfect, forms a cream, which thickens on cooling, and should adhere without oiliness to the surface of glass. Dilute before using one part of the emulsion with nine parts of hot water. The above formula gives three gallons of emulsion, and makes, when diluted, thirty gallons of wash.

NOTE.—It is of the greatest importance that the above mode of preparation is followed strictly, otherwise the result may produce an unstable emulsion, which has all the objectionable features of a mixture of water and kerosene.

Codlin Moth.

The fighting of this insect must be principally done in the spring and summer. The winter work must consist in reducing the hiding places for the cocoons. As these are often found many inches below ground, the soil should be removed and the bark scraped. If the trunk has very rough bark it should also be scraped, and if it is covered with lichens or moss, give it a spraying with a weak lye solution.

The most successful remedy last season proved to be the arsenical mixtures, viz.: Paris Green, London Purple, and White Arsenic. In the coast counties, where more or less damp nights prevail, London Purple and White Arsenic did some damage to the foliage, and for this reason the Paris Green is more preferable; also its effect is most lasting.

Strength to be Used.

For early ripening apples and pears, spray once with one pound of Paris Green to one hundred and eighty gallons of water, when just out of bloom. For fall and winter apples it may be advisable to spray ten days later with an application of one pound to two hundred gallons, while the blossom ends of the apples are still turned upwards. Use the Paris Green without any additions, simply stirring the liquid continually; also, straining it before using. In isolated places, probably one spraying of Paris Green will suffice; however, when the orchard is surrounded with infested orchards not treated, two applications with Paris Green, and followed with sulphide of soda, and soap, seem to be necessary.

Possible Danger of Using the Arsenites.

The greatest care should be taken in handling the arsenic mixture, avoiding getting any in cuts on the hands, also preventing either human beings or animals from eating the young fruit. (Stock should be excluded from the orchard for at least six weeks.) If no application is made after the fruit has commenced to turn downward, there is really no danger to be apprehended; unless, in case of an overdose being used on a tree, and the foliage be affected to such an extent that the leaves will fall, and with them the fruit.

Band System.

As an additional help of decreasing the last broods of codlin moth, the banding system is certainly worth following; but, besides, putting burlap bands around the tree, say one foot from the ground, on larger trees put rags in the crotches, and they should be examined, as well as the bands, once a week.

Woolly Aphis.

Four pounds of rosin; three pounds of sal soda; water to make four and one half gallons. Dissolve the sal soda in a few pints of water; when thoroughly dissolved, add the rosin. Heat until dissolved, and add water finally. Use one and one half pints of solution to the gallon of water. Use at a temperature of about 100° Fahrenheit.

Gas Lime.

On a whole, I have found no remedy as inexpensive and efficacious as gas lime—the refuse of gas works. Outside of its penetrating odor this material has but one objection; it is a strong medicine that must be used with care, and the dose must be regulated somewhat according to the soil and subsoil, and the age of the trees. There is necessarily some difference in its strength, according to its freshness, as it gradually loses some of its ingredients by exposure to the air, and especially to rain. Nevertheless, when applied to a given spot, it will retain its efficacy for at least three years.

Striped Squash Bug.

One tablespoon of saltpeter dissolved in a pail of water; put a pint around each hill of squashes, pumpkins, or melons.

I have tried to ascertain if better remedies are in use in other States and foreign countries. With this view, I have corresponded with people everywhere for nearly a year. The information received I had intended to publish in pamphlet form, but have given up the idea from the fact that very little, if anything, is known of remedies against insect pests outside of the United States. There are more and better remedies in use in this State, than in any other State in the Union, or any country in the world.—[Secretary.]

CORRESPONDENCE.

PARASITES ON THE SAN JOSÉ SCALE AT LOS ANGELES.

SAN GABRIEL, May 6, 1888.

B. M. LELONG, *Esq.*, *Secretary of the State Board of Horticulture:*

DEAR SIR: Mr. J. W. Wolfskill and Mr. Alexander Craw, of Los Angeles, having noticed the progress of the San José scale at Los Angeles, were for a time at a loss to account for its seeming disappearance. A close examination revealed the fact that they were being killed by a minute parasite. Last week Mr. Alexander Craw and myself visited a place on Jefferson Street, in the southern part of the city, where the pear trees were last year very badly infested, some of them having died; now they are looking green and thrifty, and much of the new growth is two feet long.

It is hard to find a living specimen of the scale, and many of the dead scales show little holes in them where the parasites have hatched. Mr. Craw says that the parasite is the same as the one that works on the willow scale.

A. SCOTT CHAPMAN,
State Horticultural Commissioner.

SAN FRANCISCO, November 1, 1887.

B. M. LELONG, *Esq.*, *Secretary State Board of Horticultural Commissioners, San Francisco, Cal.:*

SIR: I beg leave to inform you of the action of our Society at its last meeting, held in San Francisco, October twenty-eighth, to wit:

A resolution was offered by Mr. A. T. Hatch:

Resolved, That the members of the State Horticultural Society acknowledge with sincere thanks the courtesy extended to them by the officers of the State Board of Horticulture, in the welcome to hold their monthly meetings in the elegant and accessible rooms of the Board.

Resolved, That we express our sense of appreciation of the enterprise of the Board in affording not only to our Society, but to horticulturists generally, a headquarters in San Francisco befitting the importance of our great fruit interest, supplied with horticultural literature and museum specimens, and we can but express our belief that providing such facilities for gaining information will be of great permanent value, not only to our own citizens, but to the many desirable people from abroad who are now seeking homes in this State.

This resolution, being duly read, was, upon motion, adopted unanimously.

Yours respectfully,
E. J. WICKSON,
Secretary State Horticultural Society.

SAN FRANCISCO, May 3, 1888.

B. M. LELONG, *Secretary State Board of Horticulture:*

DEAR SIR: I am instructed to notify you that at a meeting held this day a unanimous vote of thanks was tendered you for the very liberal use of rooms for their meetings, so generously accorded them for many months. Each and every member highly appreciates the courtesies extended.

Respectfully,

MRS. L. E. PRATT,
Secretary Ladies' Silk Culture Society.

WASHINGTON, D. C., May 10, 1888.

B. M. LELONG, *Secretary, 220 Sutter Street, San Francisco:*

DEAR SIR: Your communication of the first instant, containing resolutions of the State Board of Horticulture, is duly received. In reply, I have to say that the documents referred to, under the United States statutes, are to be distributed to the people through their respective Congressmen. If you will be kind enough to furnish me with a list of the citizens of the Fifth District whom you desire to receive the Consular Reports, I will, if possible, fill them all; this being done through the Department, will save postage on the distribution. I can readily understand and appreciate that you have a better knowledge as to those whom this publication would benefit than I have.

Respectfully yours,

C. N. FELTON.

WASHINGTON, D. C., May 14, 1888.

Mr. B. M. LELONG, *Secretary State Board of Horticulture, 220 Sutter Street, San Francisco:*

DEAR SIR: I am directed by Senator Stanford to acknowledge your letter of May second, with resolution adopted by the fruit growers of California, and to say that the same will have his consideration.

Respectfully,

G. FRERE FLINT,
Private Secretary.

WASHINGTON, D. C., July 19, 1888.

Mr. B. M. LELONG, *Secretary State Board of Horticulture, San Francisco, California:*

DEAR SIR: Yours of July twelfth, and the six bound copies of your "Treatise on Citrus Culture," have just been received. I wish to thank you for this favor, and assure you that it is highly appreciated. Before this you have no doubt received the advance copy of the special report which I have just issued on tropical fruits, etc.

I am glad to know that you have in mind to issue a revised edition of your late publication, and if I can be of any use to you in any way I hope you will feel free to call upon me. Your biennial report will no doubt contain a great deal of valuable information.

Very respectfully and fraternally,

H. E. VANDEMAN,
Pomologist.

WASHINGTON, D. C., May 11, 1888.

To the Secretary of the State Board of Horticulture, 220 Sutter Street, San Francisco, California:

DEAR SIR: I am in receipt of your letter of the second instant, transmitting a resolution of the State Board of Horticulture respecting the white scale bug.

I will take pleasure in doing what I can to secure the appropriation mentioned in the resolution.

Very truly yours,

WM. W. MORROW.

WASHINGTON, D. C., July 25, 1888.

Mr. B. M. LELONG, *Secretary State Board of Horticulture, San Francisco, California:*

SIR: I am in receipt of your request of the eighteenth instant, for a complete set of the Consular Reports.

In reply, I beg to say that these reports are published by the Department of State, and your communication has been referred to that department with favorable indorsement.

Very truly yours,

NORMAN J. COLEMAN,
Commissioner.

WASHINGTON, D. C., July 26, 1888.

Mr. B. M. LELONG, *Secretary State Board of Horticulture, 220 Sutter Street, San Francisco, California:*

DEAR SIR: Yours of July eighteenth, to Senator Stanford, has been received.

In reply to the same I have to-day mailed you six (6) sacks, containing two hundred and ten copies of the report of the Commissioner of Agriculture for 1887. They are franked so that you can send the same through the mails.

Very respectfully,

JOHN B. McCARTHY,
Private Secretary.

P. S.—Please acknowledge receipt.

WASHINGTON, D. C., May 9, 1888.

Mr. B. M. LELONG, *State Board of Horticulture, 220 Sutter Street, San Francisco, California:*

SIR: Yours of May first, to Senator Stanford, has been received.

Senator Stanford to-day requested the State Department to supply you with the Consular Reports, as requested therein.

Respectfully,

J. B. McCARTHY,
Private Secretary.

San Gabriel, August 11, 1888.

Mr. B. M. Lelong:

Dear Sir: I have sent in my resignation to the Governor of the State as a member of the State Board of Horticulture. My reasons are that the white scale forbids my being a horticulturist, and ties my purse strings.

I thank you for the uniform courtesy you have always shown me, and hope that the Legislature will appreciate your labors, and grant you further aid.

Very respectfully,

A. SCOTT CHAPMAN.

Napa City, California, December 8, 1887.

B. M. Lelong, *Esq.:*

Dear Sir: I find the following paragraph in a daily paper: "Mr. C. H. Dwinelle, now in the town of Fulton, in Sonoma County, says that the olive should not be trained as a tree but rather as a bush with extending limbs, so that the fruit may be gathered by hand without bruising; and this idea with him is not a theory, but his observation of facts in Europe." As to the olive and the manner of pruning that tree, as recommended by Mr. Dwinelle, I shall certainly differ with Mr. Dwinelle's European experience, and would not follow any European practices in regard to pruning or training trees either of the olive or the vine. I will simply say that this method recommended will not be the course that olive growers will pursue in California, and will give my reasons for this opinion further on, which will apply to many varieties of deciduous as well as citrus fruits. The "dwarfing" of trees in California was extensively experimented on in the earlier days of fruit tree planting by men well able to judge of these matters. I should much prefer to follow the advice of such men as Cooper and Pohndorff and Flamant. As regards horticulture and how to enter upon the business of renewing the olive or any other branch of fruit industry, I would never look to a European method or a European for advice how to plant and train trees in California; they will have to come to the California methods of doing this work both in tree culture and viticulture. Our soils are new and not exhausted; our land is not limited to terrace hillsides and rocky flats; there is no scarcity of land; no necessity for crowding our orchards or dwarfing our trees, and also dwarfing our fruits; the larger and more thrifty our trees the better quality will be our fruits, nuts, and oil. As Mr. Block, of Santa Clara, remarked before the Board at our last meeting: "I would prefer the advice and opinion of the American plowboy to one of these foreigners on the cultivation of the soil in America." And as to the matter of gathering the fruit, trust to Yankee ingenuity for the rest. I may continue this subject on the olive question farther, but I do not feel that it is a subject that any mere novice can handle, therefore I shall handle it rather tenderly.

Yours respectfully,

W. M. BOGGS.

Napa City, December 14, 1887.

B. M. Lelong, *Esq., Secretary State Board of Horticulture:*

Dear Sir: In my last communication—or "report," if you choose—I stated that I would beg leave to differ with the remarks of Mr. Dwinelle, made on the subject of pruning the olive low, so as to enable the producer to pick the berries off the trees, instead of gathering them in the usual way. I do not pretend to say that my remarks were confined to the olive tree alone—but referred to fruit trees in general. The learned dissertation on the different varieties of the olive—delivered by F. Pohndorff, before the State Horticultural Society, and published in the late biennial report of the State Board of Horticulture—contains a very lengthy description of all the known varieties of that ancient and time-honored fruit; and I will refer the searcher after information on all subjects connected with a choice of varieties, and the kind of soils best adapted to the olives, and the method of planting, to that very valuable memoir on "Olive Culture." In addition, I would call the attention of those interested in this branch of industry in California, to the work of Hon. Ellwood Cooper, President of the State Board of Horticulture. Mr. Cooper has for many years been extensively engaged in the culture of the olive at Santa Barbara, and also in the manufacture of a superior olive oil, and his experience is invaluable.

There are many reasons why we should seek advice and information on the subject of the growing of fruit in California, from those experienced in California productions, in preference to those practiced in European methods, let them be ever so learned in the ways of their own country. The climate and soils and experiences are so entirely different in this country that a different system seems to be necessary, not only in tree culture, but also in the cultivation and pruning of the vine—at least I am so informed by the most intelligent European cultivators of the soil in California. I have my own experience and opinion on this same subject. I have tried many methods both of pruning and training the vine, and I find none better than that adopted by the "Mission Fathers," who had been taught by their own dearly bought experience which compelled them to adopt a method best suited to the soil and climate of the locality in which they lived. I have observed many efforts made by our European friends to pursue a different plan, and they universally and invariably fall back on the old California plan. The best vineyards in California to-day are pruned on the same plan as the old "Mission Fathers" used in pruning their vineyards.

But this is diverging from a report on the horticultural prospects of my district. There is much room for improvement in this as well as adjoining districts. Through the indifference of the community, fruit pests have been allowed to increase, so that the subject is now forcing the authorities of our town and county to look more favorably toward adopting other measures for the destruction of these pests than the State law provides. The law has heretofore been utterly ignored, especially in and about Napa City, where *Icerya purchasi*, or fluted scale, has taken possession of all the shade and ornamental trees bordering the streets and lawns of the city. The attention of the public was called to the encroachments of this pest some two years ago, by the distribution of circulars, containing the law on the subject, and notice of the penalty; and also by the appointment of quarantine guardians. But no attention whatever was paid to the frequent notices given in our local papers of the appearance of this worst of all tree pests in the beginning, and finally it has forced its way all over almost every tree, both in public and private grounds, in such prolific quantities as to cause the Board of Supervisors to order the beautiful shade trees in the public square of the County Court House grounds to be destroyed. This doubtless will be followed by an order of the City Trustees, declaring by law that all the trees along walks be cut away. And all this trouble and labor could have been avoided by the destruction of a few worthless acacia trees in front of one man's gate, on a principal street in the town, from which myriads of this loathsome pest sprang. It is now covering all the locust trees and black walnut trees of twenty and thirty years' growth. If the law had been heeded in the first place, all these beautiful shade trees might have been preserved for years to come.

But this is not all the lost time and valuable labor. These pests will doubtless spread to the adjacent country and attack our young orchards, causing much labor and expense to the owners. It is to be hoped that the destruction of the infested trees in the town and surrounding country will check the spread of these pests; if not, I fear that in another year or two you will have no report from this quarter on fruit culture.

I have no report to make on the amount of fruit shipped from the various orchards and points of shipment in the counties comprising the Second District, other than that the past season was a generally favorable one to the fruit growers of this district. When the report of the recent Convention of Fruit Growers, held at Santa Rosa, is published, it will doubtless give satisfaction and much information on the horticultural prospects of this and adjacent districts, as that Convention was composed of some of the most intelligent and enterprising orchardists from all sections of the State.

I have distributed several hundred copies of the late biennial report of the State Board, and still they are being called for almost daily, which shows that the work of the State Board is very highly appreciated, so much so that the supplies furnished me from the office of the Board have become exhausted, and I find it difficult to retain one copy for my own use.

Very respectfully,

W. M. BOGGS.

ROSTER OF OFFICERS

OF NATIONAL, STATE, AND IMPORTANT HORTICULTURAL AND KINDRED SOCIETIES, FOR THE YEAR 1888.

American Horticultural Society.

Hon. Parker Earle, President	Cobden, Illinois.
W. H. Ragan, Secretary	Greencastle, Indiana.

American Pomological Society.

Hon. P. J. Berckmans, President	Augusta, Georgia.
C. W. Garfield, Secretary	Grand Rapids, Michigan.

American Forestry Congress.

Hon. G. W. Minier, President	Minier, Illinois.
B. E. Fernow, Secretary	Washington, D. C.

American Association of Nurserymen.

Hon. C. L. Watrous, President	Des Moines, Iowa.
D. Wilmot Scott, Secretary*	Galena, Illinois.

Society of American Florists.

Robert Craig, President	Philadelphia, Pennsylvania.
Edwin Lonsdale, Secretary	Philadelphia, Pennsylvania.

Arkansas State Horticultural Society.

E. F. Babcock, President	Little Rock.
S. H. Nowlin, Secretary	Little Rock.

Colorado State Horticultural Society.

E. J. Hubbard, President	El Moro.
J. M. Clark, Secretary	Denver.

Colorado State Horticultural and Forestry Association.

A. E. Gibson, President	Greeley.
Alex. Shaw, Secretary	Denver.

Florida Fruit Growers Association.

D. Redmond, President	Jacksonville.
D. H. Elliott, Secretary	Jacksonville.

Georgia State Horticultural Society.

P. J. Berckmans, President	Augusta.
T. L. Kinsey, Secretary	Savannah.

Indiana Horticultural Society.

Allen Fuvuous, President	Danville.
C. M. Hobbs, Secretary	Bridgeport.

Illinois State Horticultural Society.

H. M. Dunlap, President	Savoy.
A. C. Hammond, Secretary	Warsaw.

Iowa State Horticultural Society.

C. G. Patton, President	Charles City.
Geo. Van Houton, Secretary	Lenox.

Kansas State Horticultural Society.

Geo. Y. Johnson, President	Lawrence.
G. C. Brackett, Secretary	Lawrence.

---

* Deceased.

Kentucky State Horticultural Society.

A. P. Farnsley, President .... Louisville.
William Hanes, Secretary .... Buchel.

Massachusetts Horticultural Society.

Henry P. Walcott, President .... Cambridge.
Robert Manning, Secretary .... Boston.

Maine State Pomological Society.

Chas. S. Pope, President .... Manchester.
D. K. Knowlton, Secretary .... Augusta.

Minnesota State Horticultural Society.

Wyman Elliott, President .... Minneapolis.
S. D. Hillman, Secretary .... Minneapolis.

Mississippi Horticultural Society.

Dr. H. E. McKay, President .... Madison Station.
J. E. Tevoy, Secretary .... Crystal Springs.

Michigan State Horticultural Society.

T. T. Lyon, President .... South Haven.
E. C. Reid, Secretary .... Alligan.

Missouri State Horticultural Society.

J. C. Evans, President .... Harlem.
L. A. Goodman, Secretary .... Westport.

North Carolina Fruit Growers Association.

J. Van Lindley, President .... Pomona.
S. O. Wilson, Secretary .... Raleigh.

Nebraska Horticultural Society.

Samuel Barnard, President .... Table Rock.
J. T. Allen, Secretary .... Omaha.

Ohio State Horticultural Society.

Hosmer G. Tyron, President .... Willoughby.
George W. Campbell, Secretary .... Delaware.

State Horticultural Association of Pennsylvania.

Calvin Cooper, President .... Bird-in-Hand.
E. B. Engle, Secretary .... Wayesboro.

South Carolina Horticultural Society.

R. M. Sims, President .... Columbia.
W. C. Clark, Secretary .... Columbia.

Texas State Horticultural Society.

T. V. Munson, President .... Denison.
Mrs. J. R. Johnson, Secretary .... Dallas.

Texas State Nurserymen's Association.

E. W. Kirtpatrick, President .... McKinney.
J. M. Howell, Secretary .... Dallas.

Wisconsin State Horticultural Society.

J. M. Smith, President .... Green Bay.
B. S. Hoxie, Secretary .... Evansville.

Green County (Missouri) Horticultural Society.

W. E. Sheffield, President .... Springfield.
D. S. Holman, Secretary .... Springfield.

Holt County (Missouri) Horticultural Society.

N. F. Murry, President .... Elm Grove.
W. R. Laughlin, Secretary .... Elm Grove.

Lafayette County (Missouri) Horticultural Society.

Dr. W. A. Gordon, President .... Lexington.
C. Teubner, Secretary .... Lexington.

Central Missouri Horticultural Society.

H. M. Myers, President .... Boonville.
C. C. Bell, Secretary .... Boonville.

Montgomery County (Missouri) Horticultural Society.

R. H. Mansfield, President .... Montgomery City.
F. Lionberger, Secretary .... New Florence.

Jasper County (Missouri) Horticultural Society.

Bennett Hall, President .... Carthage.
Z. T. Russell, Secretary .... Carthage.

Bates County (Missouri) Horticultural Society.

C. J. Roberts, President .... Butler.
Henry Speer, Secretary .... Butler.

West Tennessee Horticultural Society.

C. M. Merwin, President .... Medina.
C. J. Bell, Secretary .... Kenton.

North Colorado Horticultural Society.

J. S. McClelland, President .... Fort Collins.
J. E. Washburn, Secretary .... Loveland.

Western New York Horticultural Society.

Patrick Barry, President .... Rochester.
P. C. Reynolds, Secretary .... Rochester.

Western Iowa Horticultural Society.

L. A. Williams, President .... Glenwood.
George Van Houton, Secretary .... Lenox.

New Orleans Horticultural Society.

E. Baker, President .... New Orleans.
J. H. Menard, Secretary .... New Orleans.

Horticultural Society of Northern Illinois.

———, President .... ———
E. W. Graves, Secretary .... Sandwich.

Horticultural Society of Central Illinois.

C. N. Dennis, President .... Hamilton.
A. C. Hammond, Secretary .... Warsaw.

Alton-Southern Illinois Horticultural Society.

J. S. Browne, President .... Alton.
F. C. Riehl, Secretary .... Alton.

Warsaw (Illinois) Horticultural Society.

H. D. Brown, President .... Hamilton.
J. T. Johnson, Secretary .... Warsaw.

Berks County (Pennsylvania) Horticultural Society.

James McGowan, President .... Geiger's Mills.
Cyrus T. Fox, Secretary .... Reading.

Central Texas Horticultural Society.

Colonel W. G. Veal, President .... Dallas.
Mrs. J. R. Johnson, Secretary .... Dallas

North Texas Horticultural Society.

T. V. Munson, President .... Denison.
J. J. Fairbanks, Secretary .... Denison.

Monticello (Virginia) Grape and Fruit Growers Association.

Henry L. Lyman, President .... Charlottesville.
O. Reierson, Secretary .... Charlottesville.

Norfolk (Virginia) Horticultural and Pomological Society.

G. F. B. Leighton, President .... Norfolk.
Colonel J. Richard Lewellen, Secretary .... Norfolk.

Western Michigan Fruit Growers Association.

Walter Phillips, President .... Grand Haven.
A. J. Knisley, Secretary .... Benton Harbor.

Hennepin County (Minnesota) Horticultural and Gardeners Association.

M. Pearce, President .... Minneapolis.
Dr. L. Asire, Secretary .... Minneapolis.

Leavenworth County (Kansas) Horticultural Society.

E. J. Holman, President .... Leavenworth.
Anna Bowman, Secretary .... Leavenworth.

Cowley County (Kansas) Horticultural Society.

J. F. Martin, President .... Winfield.
J. Nixon, Secretary .... Kellogg.

Southern Ulster County (New York) Horticultural Society.

J. J. Hull, President .... Clintondale.
W. C. Caywood, Secretary .... Marlboro.

Eastern Cuyahoga (Ohio) Horticultural Society.

E. H. Cushman, President .... Euclid.
W. H. Dillie, Secretary .... Euclid.

Summit County (Ohio) Horticultural Society.

H. A. Sackett, President .... Talamadge.
M. Crawford, Secretary .... Cuyahoga Falls.

Montgomery County (Ohio) Horticultural Society.

N. Ohmer, President .... Ravenna.
Rev. Andrew Wilson, Secretary .... Ravenna.

Lake County (Ohio) Horticultural Society.

W. A. Wheeler, President .... Perry.
H. G. Tryon, Secretary .... Willoughby.

Columbus (Ohio) Horticultural Society.

J. M. Westwater, President .... Columbus.
W. S. Devol, Secretary .... Columbus.

Miami County (Ohio) Horticultural Society.

J. P. Johnson, President .... Piqua.
W. L. Perry, Secretary .... Covington.

Marion County (Indiana) Horticultural Society.

F. Beeler, President .... Indianapolis.
Mrs. Chandler, Secretary .... Indianapolis.

Wayne County (Indiana) Horticultural Society.

J. C. Stevens, President .... Centerville.
J. C. Ratliff, Secretary .... Richmond.

Plainfield (Indiana) Horticultural Society.

Daniel Cox, President .... Cartersburg.
M. Carter, Secretary .... Plainville.

Abbotsford (Quebec) Fruit Growers Association.

Charles Gibb, President .... Abbotsford.
George Fisk, Secretary .... Abbotsford.

Montreal (Quebec) Horticultural Society.

Professor D. P. Penhallow, President .... Montreal.
W. W. Dunlop, Secretary .... Montreal.

Nova Scotia Fruit Growers Association.

Henry Chipman, President .... Grand Pré, N. S.
C. H. R. Starr, Secretary .... Port Williams.

Fruit Growers Association of Ontario.

Alex. McD. Allen, President .... Goderich.
L. Woolonton, Secretary .... Grimsby.

Southwest Association of Fruit and Vegetable Evaporators.

W. J. Patton, President	Fayetteville, Arkansas.
Dr. J. F. Simonds, Secretary	Fayetteville, Arkansas.

Gulf States Fruit Growers Association.

H. W. L. Lewis, President	Osyka, Missouri.
S. M. Wiggins, Secretary	New Orleans.

STATE ORGANIZATIONS, 1888.

Alhambra (Los Angeles County) Fruit Growers Society.

A. Phillips, President	Alhambra.
C. T. Adams, Secretary	Alhambra.

California State Horticultural Society.

(Meets at the office of the State Board of Horticulture last Friday of each month.)

Prof. E. W. Hilgard, President	Berkeley.
Prof. E. J. Wickson, Secretary	Berkeley.

Colusa County Horticultural Society.

L. F. Moulton, President	Colusa.
Frank W. Willis, Secretary	Colusa.

Chico (Butte County) Horticultural Society.

E. T. Reynolds, President	Chico.
G. M. Gray, Secretary	Chico.

The Horticultural Society of Southern California.

L. M. Holt, President	Riverside.
Wm. H. Holabird, Secretary	Claremont.

Los Angeles County Pomological Society.

Thos. A. Garey, President	Los Angeles.
D. Edson Smith, Secretary	Santa Ana.

Oroville (Butte County) Horticultural Society.

John C. Gray, President	Oroville.
S. S. Boynton, Secretary	Oroville.

San Diego County Horticultural Society.

J. M. Asher, President	San Diego.
Geo. H. Bower, Secretary	San Diego.

San Joaquin County Horticultural Society.

Ezra Fiske, President	Stockton.
W. H. Robinson, Secretary	Stockton.

Santa Barbara County Horticultural Society.

Prof. H. C. Ford, President	Santa Barbara.
H. K. Bradbury, Secretary	Santa Barbara.

Santa Clara County Horticultural Society.

I. A. Wilcox, President	Santa Clara.
H. A. Brainard, Secretary	San José.

Sonoma County Horticultural Society.

J. Roberts, President	Santa Rosa.
W. C. Kelogg, Secretary	Santa Rosa.

Sutter County Horticultural Society.

B. G. Stabler, President	Yuba City.
H. P. Stabler, Secretary and Entomologist	Yuba City.

HORTICULTURAL COMMISSIONS.

Alameda County Horticultural Commission.

A. D. Pryal, President	Temescal.
A. P. Crane, Secretary	San Lorenzo.

Tulare County Horticultural Commission.

N. W. Motherall, President	Mussel Slough.
I. H. Thomas, Secretary	Visalia.

San Mateo County Horticultural Commission.

Wm. J. McNulty, President	Woodside.
Dr. L. D. Morse, Secretary	San Mateo.

San Joaquin County Horticultural Commission.

Ezra Fiske, President	Stockton.
W. H. Robinson, Secretary	Stockton.

Ventura County Horticultural Commission.

M. E. Isham, President	San Buenaventura.
N. W. Blanchard, Secretary	Santa Paula.

ASSOCIATIONS, ETC.

Anaheim Orange Growers Association.

F. A. Korm, President	Anaheim.
E. Browning, Secretary	Anaheim.

Ontario Property Owners Association.

D. B. Strope, President	Ontario.
C. D. Adams, Secretary	Ontario.

Oroville Citrus Association.

Hon. C. F. Lott, President	Oroville.
Geo. W. Harney, Secretary	Oroville.

Redding Orange Culture Association.

J. H. Miller, President	Redding.
M. D. Redding, Secretary	Redding.

Santa Cruz Horticultural Association.

L. K. Baldwin, President	Santa Cruz.
Oscar L. Gordon, Secretary	Santa Cruz.

Saratoga Village Improvement Association.

Hon. M. H. Myrick, President	Saratoga.
Carrie H. Gordon, Secretary	Saratoga.

Pacific Coast Nurserymen Association.

James Shinn, President	Niles.
R. D. Fox, Secretary	San José.

Willows Fruit Growers Association.

T. B. A. Lewis, President	San José.
A. E. Winslow, Secretary	San José.

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